St. Petersburg State University
Graduate School of Management

Master in Corporate Finance Program

INSTRUMENTS OF REAL EARNINGS MANAGEMENT OF RUSSIAN COMPANIES

Master's Thesis by the 2nd year student
Concentration – Master in Corporate Finance
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ЗАЯВЛЕНИЕ О САМОСТОЯТЕЛЬНОМ ХАРАКТЕРЕ ВЫПОЛНЕНИЯ ВЫПУСКНОЙ КВАЛИФИКАЦИОННОЙ РАБОТЫ

Я, Симонова Татьяна Сергеевна, студент второго курса магистратуры направления «Менеджмент», заявляю, что в моей магистерской диссертации на тему «Инструменты манипулирования прибылью российских компаний на основе реальных операций», представленной в службу обеспечения программ магистратуры для последующей передачи в государственную аттестационную комиссию для публичной защиты, не содержится элементов плагиата.

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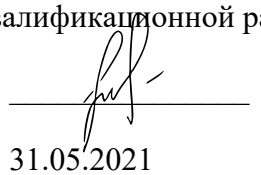

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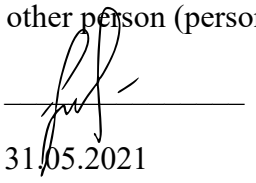

31.05.2021

АННОТАЦИЯ

Автор	Симонова Татьяна Сергеевна
Название ВКР	Инструменты манипулирования прибылью российских компаний на основе реальных операций
Образовательная программа	Корпоративные финансы
Направление подготовки	Менеджмент
Год	2021
Научный руководитель	Никулин Егор Дмитриевич, Доцент кафедры финансов и учета
Описание цели, задач и основных результатов	Основная цель данной работы заключается в определении основных инструментов манипулирования прибылью на основе реальных операций, используемых российскими компаниями, и исследовании зависимости использования каждого инструмента от различных факторов. Для достижения цели исследования выявлены инструменты манипулирования прибылью на основе реальных операций российскими компаниями, изучена зависимость инструментов манипулирования прибылью на основе реальных операций от различных факторов, определена взаимосвязь между реальными и основанными на начислении методами манипулирования прибыль. Выборка состоит из 1064 наблюдений за 133 российскими компаниями з с 2012 по 2019 годы. Первая подгруппа компаний, производящих товары, состоит из 712 наблюдений за 89 компаниями, вторая подгруппа компаний, предоставляющих услуги, состоит из 352 наблюдений за 44 компаниями. Эконометрический анализ позволил выявить взаимосвязь между каждым инструментом манипулирования прибылью на основе реальных операций и различными факторами компаний, принадлежащих российским компаниям. Манипулирование прибылью на основе реальных операций при помощи манипулирования продажами имеет положительную значительную связь с ростом продаж и отрицательную связь с ROA. Манипулирование прибылью на основе реальных операций при помощи перепроизводства положительную значительно связано с размером компании и ростом продаж и отрицательно зависимо от ROA, в то время как манипулирование прибылью на основе реальных операций при помощи сокращения дискреционных расходов имеет отрицательную значительную связь с размером компании и положительно значимо зависит от роста продаж.
Ключевые слова	Манипулирование прибылью, манипулирование прибылью на основе реальных операций, российские компании, манипуляции продажами, перепроизводство, сокращение дискреционных расходов

ABSTRACT

Master Student's Name	Simonova Tatiana
Master Thesis Title	Instruments of Real Earnings Management of Russian Companies
Educational Program	Master in Corporate Finance
Main field of study	Management
Year	2021
Academic Advisor's Name	Nikulin Egor D., Associate Professor, Department of Finance and Accounting
Description of the goal, tasks and main results	The research goal of the paper is to identify main instruments of real earnings management that are used by Russian companies and investigate the dependence of using each instrument on different factors. In order to achieve the research goal, instruments of real earnings management that are used by Russian companies are identified, the dependence of real earnings management instruments on different factors is studied and the relationships between real and accrual-based techniques of earnings management activities of companies operating in Russian market are determined. Sample consists of 1064 firm-year observations of 133 Russian-owned companies for 8 years from 2012 to 2019. Sample is divided into two subsets based on the area of the company's activity. First subset of companies producing goods consists of 712 firm-year observations of 89 companies, and second subset of companies providing services consists of 352 firm-year observations of 44 companies. The econometric analysis provided findings on relations between each real earnings management instrument and different factors, such as size of the company, its sales growth, its return on assets, and leverage level for Russian-owned companies. Sales manipulation real earnings management level has positive significant relationships with sales growth, and negative relationships with ROA. As for the production real earnings management, it has positive significant relations with size and sales growth, and negative significant dependance on ROA, while discretionary expenses real earnings management have negative significant relation with size and positively significantly depends on the sales growth.
Keywords	Earnings management, real earnings management, Russian companies, sales manipulations, overproduction, discretionary expenses reduction

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Introduction

Main idea of the Master Thesis is to provide information about instruments that are used by Russian companies to manipulate earnings by using real operations such as overproduction, price discounts and reduction of discretionary expenditures. The research will be useful for both investors and auditors because it will show what instruments managers may use in order to improve the financial reports. Analyzing these instruments may reveal manipulations and reduce the possibility of being misled by managers.

The research goal of the Master Thesis is to identify main instruments of real earnings management that are used by Russian companies and investigate the dependence of using each instrument on different factors.

In order to reach the research goal three main research questions of were developed:

1. What are the instruments of real earnings management that are used by Russian companies?
2. What is the dependence of real earnings management instruments on different factors?
3. What are the relationships between real and accrual-based techniques of earnings management activities of companies operating in Russian market?

Also, the objectives of the Master Thesis were formulated to provide a better vision of the achievement of the research goal:

1. To study the existing articles on the earnings management;
2. To determine what are the most common instruments of real earnings management;
3. To study existing approaches to determine instruments of real earnings management and choose the most appropriate one for the Russian market;
4. To conduct the research on what are the instruments of real earnings used by Russian companies;
5. To formulate the managerial implications of the results.

For now, very few studies are based on the research of real earnings management, despite the fact that there is a large number of evidences that managers of various companies are engaged in profit manipulation by using real operations. Moreover, toughening of the legislation in order to protect investors' rights, that takes place almost every year, lead to the situation in which managers have to switch from the accrual-based earnings management to the real earnings

management in order to control their company's profit to meet the benchmark and, thus, mislead both external and internal investors.

It is crucial to study real earnings management, due to managers switching from accrual-based to real earnings management.

Even despite recent increase in the number of studies devoted to real earnings management, there is still not enough information that will be helpful for determining it. The results of past studies on the real earnings management are mostly contradictory on some points, such as effect of using real earnings management on future performance, auditors' sensitivity and reactions on real earnings management, etc.

The other reason why this topic is relevant is uncertainty on instruments of real earnings management. For now, there are only several instruments of real earnings management are determined, and opinions on them are contradictorily as well. Company may use overproduction by producing abnormal amounts in order to decrease fixed costs by distributing overheads throughout the units, and, thereby, improve earnings per certain period [Hashemi and Rabiee, 2011, p.26]. Also, it may use marketing operations in order to increase sales. This type of real earnings management is more likely to appear at the end of the fiscal period, when the company is desperate to achieve certain goals by managing sales [Chapman and Steenburgh, 2010]. The reduction of the price tends to have short-term effect, while regular advertising is mostly aimed on longer effect. R&D may be a part of real earnings management as well. Company can save its costs by cutting the R&D expenditures, however, these operations are likely to reduce company's ability to compete with companies that are involves in R&D [Gunny, 2010]. Despite the awareness on these aspects of real earnings management, it is clear that these are not the only ways to manipulate earnings. Determining other instruments of real earnings management will help auditors to determine whether managers are engaged in company's income manipulations, studying these instruments will help to eliminate the negative effect of real earnings management of both auditors and investors.

Chapter 1. Theoretical Aspects of Real Earnings Management

1.1 Earnings Management as the Way of Profit Manipulation

1.1.1 Definition of Earnings Management

Earnings management is a popular tool nowadays used by managers of different companies in different industries. Managers use earnings management mostly in order to manipulate earnings of the company to achieve certain goals. These goals may be, for example, benchmarks, price of shares, etc. Also, managers tend to use earnings management in order to achieve personal goals, such as awards, increase in wages, or, on the contrary, managers may feel the obligation to manipulate earnings due to the pressure from the employer's side in order to keep the stock price high.

It is not possible to ignore older academic evidences of earnings management existence, because they are crucial, since earnings management is quite new sphere in the science literature and most of modern literature is based on the assumptions made in the end of the last century. These evidences are the ones proposed by Healy and Wahlen, Schipper, Roychowdhury, Trueman and Titman.

For example, Healy and Wahlen in their analysis of empirical studies of earnings management literature state that earnings management takes place when managers aim to alter financial reports by using the judgment in financial reporting and financial structuring. They also state that managers are involved in such activities mostly for two purposes. They either wish to mislead stakeholders by providing manipulated figures of economic performance of the company or to influence on the contracts that mostly depend on financial reports made by company [Healy and Wahlen, 1999].

They also note that the earnings management is a kind of a language that manager use in order to communicate with external stakeholders. They operate the financial statements or some real actions to portray a positive picture of economic or financial performance of the company to engage new investors and reassure the existing ones.

Thus, main aim of using earnings management can be determined as hiding the profits fluctuation throughout the year, so the company's performance would look more reliable and

attractive for the shareholders. However, this process is risky, as far as the real picture of company's performance is violated by intervention of these earnings' manipulation. So, earnings manipulation may mislead investors and, hence, degrade company's image in a long-term perspective.

Determining earnings management may be challenging in most of cases. There are some tendencies that suggest that company is using earnings management. For example, Trueman and Titman believes that earnings management is applied in order to smooth the income if the company's earnings for the certain period are less than it was expected. In this case, managers may move part of the earnings from the second period to the first one or vice versa, depending on which figure delays from the expected one more, in order to provide more sustainable picture by hiding real performance [Trueman and Titman, 1988].

In conclusion, earnings management is used by many managers all over the world in companies that operate in different sectors. Earnings management is usually stated as a way of company's income manipulations in order to achieve certain goals and make the company's performance more reliable and attractive for the existing or possible future shareholders and external investors.

1.1.2 Incentives of Using Earnings Management

Understanding why managers use earnings management is a difficult process due to the complications of determining earnings management cases. It is mostly impossible to understand the reasons of using it before finding evidences of earnings management implications. So, in order to find incentives, one should pay attention on whether managers apply earnings management, analyze its use, and only after that come to conclusion of the real explanation of employing earnings management in certain situation.

In particular, Healey and Wahlen (1999) discuss reasons of applying earnings management in different situations and argue that one of the most popular purpose of applying earnings management is the stock market. In this case managers may use earnings management prior to initial public offers or other equity offers. Managers tend to understate earnings level before the management buyout and overstate it before the equity offers. In the last case, managers are likely to decrease earnings right after the overstating period. Prior researches also show the evidence of using earnings management to meet the expectations of the stock market and analysts' forecasts.

Here, earnings management is mostly consisting of using unexpected accruals to manage the earnings both upwards and downwards. Another thing is that managers may be targeted on attraction of specific investors. Then, they try to meet the expectations of certain types of people, usually through the research and development (here and after referred as R&D) cutoffs. Finally, researchers underline that managers might be forced to manipulate earnings management due to specific contracts. As an example, lending or compensation contracts sometimes lead to the earnings management for getting higher bonuses, increasing rewards, and dealing with possible debt covenants' violations.

Specifically, incentives to use earnings management are described by Beneish (2001). Four main reasons of managers manipulating earnings are determined. Same as Healey and Wahlen (1999), Beneish mentions equity offering as one of the incentives that make managers report fake earnings, especially while making IPO. The second incentive is driven by debt covenants that controls whether the conditions of receiving a loan stated by creditor are respected by the firm. In this case companies are likely to report higher income in order to get less strict contract conditions by looking more stable. Manipulations with income may also allow companies to achieve lower costs if the debt covenant was violated. The third one is related with the compensation agreements. Depending on the compensation plan managers may present lower earnings results in the short-term perspective to get higher bonuses in future. This idea is also supported by evidence found by Bergstresser and Philippon (2004). They demonstrate positive correlation between the level of CEO's compensation sensitiveness to share prices of the company and usage of earnings management by company's managers, especially CEOs. The last incentive mentioned that make managers alter earnings is insider trading. Here, managers employ controlling income to mislead potential investor or to manipulate on the stock markets by getting the insider information. This suggests that managers may act as the informed traders in two ways in order to trade for his or her own benefit. Managers informed about future manipulations are able to buy stocks when they know about planned stock price increase or they are capable to sell them while recognizing eventual price decrease.

To sum up, managers are involved in earnings manipulations in order to hide profit fluctuations throughout different periods and meet different benchmarks (stock market's or investors' expectations) in order to provide more positive and pleasant picture of the company's performance. Different incentives to overstate or understate earnings level by using one of the earnings management's techniques exist and vary from the company's structure and working conditions. The most popular ones are equity offerings, debt covenants, managers' compensation contracts and insider trading information.

1.2 Relationship between Accrual-Based and Real Earnings Management

1.2.1 Difference between Accrual-Based and Real Earnings Management

Two strategies of earnings management that occurs in companies of different industries throughout the world are accrual-based earnings management (here and after referred as AEM) and real earnings management (here and after referred as REM). While the first strategy has a long history and is widely known to auditors, the second one appeared relatively recently.

Generally, AEM is the way of manipulation of the company's performance via changes in accounting methods or abnormal accruals. The main problem with accrual-based earnings management is that it is fully legal process if it takes place within GAAP (Generally Accepted Accounting Principles that is a set of accounting rules and standards presented by the Financial Accounting Standards Board (FASB)) or other principles that are valid in a particular country. The standard settings tend to concentrate on one of two aspects: either credibility in accounting data, or relevance and timeliness [Enomoto, Kimura and Yamaguchi, 2013]. In the first case, when companies have to provide very credible information, they usually present not recent or outdated numbers. Whether in the second case they tend to ignore trustworthiness of the information and focus on the relevance of the provided statements. Thus, managers are mostly free in their reporting actions, so they may use the aggressive or conservative strategy while proceeding with financial reports.

However, it is becoming harder with every new restriction in standards, so many managers decide to smooth earnings by using method of earnings management that is based not on the accruals, but on real operations, even if it is not quite fair. The main difference between accrual-based earnings management and real earnings management is that process of the last one is not about choosing or changing accounting policy. REM is concentrated on choosing and changing the timing of real operations.

As the phenomenon of earnings management is widely known and studied among researchers all over the world in different markets, most of the studies are concentrated on the AEM, for the long time this sphere was the only one detected by the researchers. However, since the evidence of earnings manipulation through the real operations was found in the late 1980s, it is crucial to study this side of earnings management, REM, as well. For now, only several articles on determining real earnings management exists, most of them are based on the evidence of the developed markets. This situation is mostly due to the complications of determining managers'

manipulations in real operations, as far as it requires full immersion in the company's activities and reports.

The costs of using AEM and REM differ as well. Using AEM may not cost much to the company, while REM may negatively affect the company's future cash flows. This happens mostly due to R&D (research and development) reduction in the period when REM is used. The same situation may occur with overproduction, as far as handling a large amount of inventory can be unfavorable for the company's health and result in increased costs in the long-term period. This fact was approved by a list of studies provided by different researchers, such as Cohen and Zarowin, Badertscher, Evans et al.

Thus, real earnings management is a new way of earnings manipulations. The main difference between accrual-based earnings management and real earnings management follows from their titles: AEM is the way of manipulation of the company's performance via changes in accounting methods or abnormal accruals, while REM is concentrated on manipulate earnings by using real operations.

1.2.2 Interrelation between Accrual-Based and Real Earnings Management

It follows from the previous point that accrual-based earnings management and real earnings management have the same aim but different implications. This fact may lead to the delusion that managers that have an incentive to use earnings manipulation always have to use one of them in order to provide a better perception of company's performance. However, it is not quite true in some cases.

As far as real earnings management is a relatively new case, most of the studies were concentrated on comparison of AEM and REM. However, researchers' opinions mostly differ on the relationship between AEM and REM. While some articles provide proofs of substitution of REM for AEM, others show evidence on a high possibility that company's managers may not switch from AEM to REM but add REM to already used AEM.

In their study on comparison of AEM and REM Enomota, Kiruma and Ymaguchi argue that there is a big difference between AEM and REM. They point out this difference by comparing the investor's safety. The rights of investors are reserved more when managers prefer AEM over REM [Enomota et al., 2012, p.19]. In this case, accrual-based and real earnings managements are

two very different practices that cannot be identified as one system and cannot be used at the same period of time.

Zang (2012) also dedicates study to the trade-off between REM and AEM, where she underlines the difference between these two tactics. The results show that companies tend to choose AEM over REM, when the first one is costlier for them, this is mostly the case when the company has a bad level of health, worse financial or competitiveness conditions, or face a higher tax level. Therefore, the evidence of substitution relationships between REM and AEM is provided.

On the other hand, Hashemi and Rabiee proved the complimentary relationships between accrual-based earnings management and real earnings management. Based on the evidence from Iranian companies that are listed in the Tehran Stock Exchange, it can be seen that managers may use real earnings management before going to accrual-based one [Hashemi and Rabiee, 2011, p.32]. That means that managers may use AEM as the extension of REM, using REM as one of the parts of AEM.

Overall, the opinions on the relationship between accrual-based and real earnings management are contradictory. There are both evidence of either managers switch from AEM to REM, or managers add REM to the already used AEM. Therefore, it is possible that some companies may use REM as the precedence to AEM, proving that REM and AEM might be complimentary.

1.3 Real Earnings Management as a New Way of Earnings Manipulation

1.3.1 Definitions of Real Earnings Management

Real operations as earnings management firstly appeared in the scientific literature in the 1989 [Schipper, 1989], but became more or less popular among researchers only in the late 2000s due to the different reasons stated further. One of the basic and most important researches that initiated the study of the real earnings is the article written by the pioneer of this topic Roychowdhury in 2006.

Roychowdhury defines it as ‘departures from normal operational practices, motivated by managers’ desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations’ [Roychowdhury, 2006, p. 338], while Schipper identifies it as ‘timing investment or financing decisions to alter reported earnings or some subset of it’ [Schipper, 1989, p. 92]. In other words, according to these two crucial papers, REM is not the way of profit manipulation through the accounting statement choices as AEM is but the way of profit manipulation through the choices connected with timing of investment procedures, financial transactions or operations that have a great influence on the company’s cash flows.

The prerequisite for real earnings management’s existence was toughening of reporting legislation that led to difficulties in using the accrual-based method. Thus, managers had to switch on real business transactions in order to improve financial indicators of companies or achieve personal goals. Also, there are several other reasons that make managers to choose REM over AEM. For example, Hashemi and Rabiee point out three main reasons [Hashemi and Rabiee, 2011, p.25]. Firstly, aggressive accrual-based manipulations are riskier than operational ones. Due to the fact that AEM takes place in the statements there is a high opportunity for manipulations to be determined by commission committee or external auditors in case of examination. Secondly, REM is more flexible regarding timing. Since most of the financial statements are formed in the end of the company’s fiscal year, quarter, month or other period, managers that use AEM have the specific amount of time to proceed with the manipulations, while REM is not limited by any time frames.

Studies show that standards become tougher throughout the years and it is expected that they will become even tougher in even in the nearest future. In this case more and more firms are likely to switch from the accrual-based earnings management to the one that is based on the real operations due to its flexibility and the ability to use it during tightening of rules and laws. That is the reason why it is crucial to study REM more and find new ways of determining its usage by managers.

In other words, real earnings management is based on manipulating of timing of investments in order to influence on the company’s performance. It has appeared mostly due to the tougher restrictions of the accounting standards that makes the using of AEM harder, so, REM becomes more popular with every new constraint as it is not controlled. However, real earnings management is not fully studied and has low acceptance among the researchers in behalf of being uncovered in recent years.

1.3.2 Instruments and Strategies of Real Earnings Management

Determining ways of using real earnings management is an unsolved question by now that is studied by many researchers. Known most common instruments of the real earnings management that companies use are overproduction, price discounts and reduction of discretionary expenditures. Managers can affect the company's performance figures by using one of these ways. But for now, it is hardly possible to determine which one they tend to use more often.

By studying different articles, it is clear that managers may use overproduction as a way of real earnings manipulation. By extra production they may affect the current periods, as Hashemi and Rabiee underline in their study [Hashemi and Rabiee, 2011, p.26]. Abnormal production allows to decrease fixed costs by distributing overheads throughout the units, and, thereby, improve earnings per certain period. However, this situation only works when the marginal cost per unit does not rise gradually. In this way, extra units go to the storage and become recognizable as inventory. Inventory keeps more overheads by themselves, without adding extra amount of overheads to the actual cost of goods sold (here and after referred as COGS). Actual COGS' costs decrease, which leads to the lower operating margin for the certain period, but only in the case when extra inventory costs are lower than the loss on the COGS.

Even though this concept looks successful, it is concentrated only on the very short period of time. That is why determining REM through overproduction is possible in most cases. The earnings that were increased on that period by transferring costs from the actual production sold to extra inventory are very unlikely to be the same or at least stable during two or more periods. Thus, it is crucial to study long-term performance of the company, especially on an abnormal level of production costs.

The other most obvious thing managers may use as REM is marketing operations. In order to provide bigger figures of sales and profit, company may engage managers in providing extra discounts or extra advertising. These actions are aimed to boost sales and usually take place in the end of the fiscal period, when the company is desperate to achieve certain goals by managing sales [Chapman and Steenburgh, 2010]. Interestingly, they provide evidence that manager's use of sale discounts or new advertisement is sometimes connected with a big number of inventories. This leads to the assumption that this instrument of REM may be used right after the REM as overproduction takes place. The other thing that must be taken into the account is that marketing operations as REM may be aimed on both short-term and long-term goals, for example, discounts are usually used in order to increase sales urgently, while most of advertisings have longer lasting effect.

This type of REM is probably the most popular one, it can be seen in most companies in most of time. Managers tend to repeat their marketing REM over almost each financial period. However, companies involved in this tend to pay more for these actions. According to Chapman and Steenburgh (2010) companies usually end up with loosing almost 2.5% of earnings per share, after the marketing operations end.

R&D may be manipulated by managers as well. Company can save on costs by reducing the R&D expenditures. This is not the case of technological or pharmaceutical companies in which researches and experiments play almost the main role. However, some companies may cut expenses on researches of new applications for already existing services and products, training employees, market or clients research, and other actions that are crucial for future business development [Gunny, 2010].

It may be misleading that R&D expenditures are not so important for the company as far as it can produce products or services. Yet, in this case company not only becomes less attractive for investors and competitive due to the lack of development comparing with the industry's average, but also incurs large expenses in the future. Furthermore, most of researchers believe that type of real earnings management suggesting reduction of R&D is the costliest one due to the large increase in the future cash flows.

In order to determine whether company's managers used REM, one should pay its attention to the list of points in the financial statements of the company and compare them throughout many time periods. These points may be abnormal cash flow from operations, abnormal discretionary expenses, abnormal production costs, abnormal R&D, abnormal SG&A, abnormal gains on asset sales, and abnormal production costs. The other aspect that may undermine the fact that instruments mentioned above are the evidence of applying real earnings management is that the company's strategy cannot be ignored and must be taken into account [Gandhi, 2020] while examining figures for determining real earnings management, as far as their deviations may be the part of the company's strategy.

1.3.3 Factors Affecting the Real Earnings Management

Presence of real earnings management and choosing it over accrual-based one is due to several factors that have a great influence on managers applying REM in their companies. These factors, same as incentives of using real earnings management may lead to its increase, or, vice

versa, may act as eliminators of earnings manipulations through real managers' activities and operations.

The fact that executives are the leading power of the company is well known, thus, the relation between the executive power and usage of any income manipulations, as well as real earnings management cannot be ignored. As far as accrual-based earnings management lays within the financial reporting, therefore, is a CFO's responsibility, it is clear that the relation between AEM and company's CFO cannot be argued, whereas real earnings management relationship with executive power is more complicated. The relation between REM and executive power is contrasting to the one between AEM and the executives. Thus, managers whose company's CFO is more powerful than CEO are more likely to be involved in REM due to the high level of control over the financials, however, powerful CEO can eliminate level of real earnings management caused by aggressive CFO supervision [Baker, Lopez, Reitenga, Ruch, 2018]. This depends on statutory credentials of both CEO and CFO, as well as their personal qualities and authority among employees.

The board of directors overall has an influence on applying real earnings management techniques as well. It assumes to be the most powerful internal mechanism controlling managers' actions. As far as long-term consequences of income manipulations may be both positive and negative, board of directors may seem indifferent to REM. However, real earnings management techniques, such as overproduction and marketing operations, lead to the extra expenses and costs for shareholders, therefore stronger and interested board of directors tends to mitigate usage of real earnings management in the firm [Ge, Kim, 2013]. Moreover, there is an evidence of negative relation between real earnings management and the size of the board of directors [Tangestani, Asgari, Jahed, 2016], as far as board size leads to better control and monitoring of managers' actions.

Market pressure is also one of the factors that affects usage of real earnings management. Along with analytics forecasts, market and industry situation may increase usage of REM among managers of firms that performs poorly than expected [Ge, Kim, 2013]. In this case, it is possible that managers may convince the board of directors and make them in favor of using real earnings management techniques to beat the analysts' expectations.

The other aspect that controls applying real earnings management is a managerial entrenchment which is a part of the corporate share that is under managers' control [Salehi, Dashtbayaz, Mohtashami, 2019]. The extent of managerial entrenchment is usually in charge of agency problems occurring in the company, so managers are more likely to act in their own interests, rather than in interests of the board. In case of an agency problem appearing, there is a

positive relation between managerial entrenchment and REM [Salehi, Dashtbayaz, Mohtashami, 2019], due to the possibility of managers to act in their own interest ignoring the decree from above.

Next factor affecting the real earnings management is the external auditors. Choi et al. (2018) found evidence that the more experienced external auditor is, the more likely he or she is able to determine applying of real earnings management techniques. Hence, companies that attract Big-4 auditors are less likely to be involved in REM activities. The number of institutional investors of the company has the same role. Institutional investors do not gain as many earnings from investing into company as others, so they mostly pay attention on the company's value. Therefore, institutional investors may act as external auditors controlling the cost of equity figure and monitoring managers' actions [Gao, Shen, Li, Mao, Shi, 2020], thus eliminating the usage of REM.

Factors affecting applying of real earnings management are one of the most popular topics among REM researchers nowadays, so factors mentioned above probably are not the only factors existing. Despite the acknowledgement of such factors as executives, board size and structure, market situation and external auditors, the factors' power may vary from industry and market company operates in.

1.3.4 Real Earnings Management's Influence on the Future Performance

Most results of the real management's effect on the performance of the company are contradictory. For example, early researches show that managers involved in REM tend to sacrifice long-term performance in order to meet their short-term aims by applying some of the real earnings management techniques. Despite this fact, recent studies argue that it is not always the case.

As might be expected, usage of real earnings management may reduce the company's value. Using overproduction, as it was already mentioned, leads to increasing holding cost in future due to the higher amount of inventory held in stock and growing costs of its maintenance. Numerous discounts and advertising expenditures may not only lead to the fall of earnings per share, but to make people hoping for the same generosity in future and refusing to buy products and services for the initial price. If company's managers cut expenses on R&D, company will apparently find itself in unpleasant competitive position or miss an opportunity and lose profit.

Thus, companies use REM in order to improve short-term profits through long-term perspective [Beyer, Nabar and Rapley, 2018]. It is also proved that sophisticated investors are likely to determine using of the real earnings management which is considered as an opportunistic managerial behavior, and this will negatively affect the company's status and its public image [Roychowdhury, 2006].

However, there is an evidence provided by Gunny (2010) that companies involved in real earnings management in order to beat their goals are more likely to succeed in the future in comparison to those companies that choose more honest position and miss their benchmarks. She explains this by the fact that company bet its benchmark will achieve a better reputation and become more attractive. In this case, external investors, shareholders and lenders will consider this company as the successful one and supply more in its development. Thus, in the long-term period the company that used REM in the certain period will be more likely to achieve its benchmark without resorting to use of earnings management comparing to the ones that did not meet their goals.

There is also some evidence that engagement in real earnings management has a verry little or even no influence at all on the company's future performance. These contradictory results have probably appeared due to the difference in the methodology or in the sample, for example, some researchers study big organizations, while others are concentrated mostly on the relatively small firms and companies. Moreover, the market in which companies operates is important as well. As an example, characteristics of different industries or markets of different countries cannot be ignored.

Nonetheless, evidence shows that small companies are more likely to use REM for signaling future positive performance. They tend to use it due to the fact that their information environment is less robust, for example, these companies have high stock return volatility or high bid or ask spread. Moreover, usually small companies are studied by experienced external auditors less often than the big ones, that is why these companies are engaged in real earnings management mostly because they face difficulties in achieving certain benchmarks or goals [Beyer, Nabar, Rapley, 208]. At the same time, larger companies that are involved in real earnings management activities mostly use it opportunistically in order to mislead external investors and existing internal shareholders.

1.3.5 Way of Limiting Real Earnings Management

It was already mentioned that accrual-based earnings management may be controlled by toughening the accounting legislation, the situation with the real earnings management is much more complicated. As far as not that much literature is conducted to the researches on real earnings management by now, there are not so many ways of controlling the use of REM by companies' managers.

Opinion that toughening of legal regimes may eliminate or at least reduce the use of REM was rejected by Choi et al. (2018). By using the sample of 22 countries they provide evidence that REM is positively related with the legal regime. It is proved by the fact that the percentage of companies engaged in REM is greatly bigger in countries with stronger legal regime, that in the ones with weaker rules. It is connected with the fact that tightening of legislations reduce the opportunity of using AEM by managers, so they have to switch on real operations.

For now, there is only one way of reducing REM used by company's managers exists and it is the attraction of external auditors. The negative relation between REM and presence of external auditors occurs even in countries with tight legal regime. The interview carried out by Commerford et al. (2016) among 20 auditors shows that auditors face difficulties and even discomfort when they collide with REM. Despite this fact they have stated that they pay a lot of attention to determine it. Auditors use not only their experience, but also emotions and intuition to identify the use of REM, therefore, the more knowledgeable the auditor, the lower the level of REM [Commerford et al., 2016]. Moreover, as it was already mentioned, involving Big-4 auditors will definitely lead to minimizing the amount of real earnings management used by managers [Choi et al., 2018].

Therefore, it is crucial to encourage companies in involving high qualified and experienced auditors, especially in the countries with stronger legal regime concerning companies' operations or structure. In that case, managers will be more limited in their actions and will not be able to manipulate the company's earnings. Moreover, the investor's rights would be better protected better.

1.4 Approaches to Assessing the Real Earnings Management

1.4.1 Roychowdury's Model of Measuring Real Earnings Management

Most of the real earnings management researchers are made by using or modifying the model of measuring REM proposed by Roychowdhury (2006). In his study he developed the cross-sectional analysis that is based on Dechow, Kothari and Watts (1998) models. The main idea is to express the normal cash flows from operations as a linear function of sales and change in sales in the current period. The deviations from the normal level of the cash flows present the abnormal cash flows from operational activities which can be considered as the evidence of using the real earnings management.

The model is based on three ways of income manipulations through real operations that are considered by author to be the main ones: sales manipulation, reduction of discretional expenses, and overproduction. The model studies cross-sectional variation in real activities manipulation among studied firms that may take place due to the existence of four sources: industry membership, incentives to meet zero earnings, earnings management flexibility, and institutional ownership [Roychowdhury, 2006]. First possible source of the cross-sectional variation, industry membership, is determined by the industry in which company operates, since the author believes that level of abnormal operational costs varies from the scope of the company. Second source, incentives to meet zero earnings, includes the presence of debt, growth opportunities, and short-term creditors that may influence on the manipulation's level as well. Third aspect, earnings management flexibility, defines the amount of income smoothing through the level of freedom managers have in a certain company including manipulations with inventory, ability to make discounts and to accelerate sales, and achieving the high stocks of receivables. The presence of the last source of potential cross-sectional variation, institutional ownership may lead to applying real earnings management due to the stronger pressure on managers and fear to report company's losses.

Thus, Roychowdhury (2006) uses the cross-sectional regression for each industry and year calculating the cash flow from operations (here and after referred as CFO) depending on the level of assets and sales shown below:

$$CFO_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta_1(S_t/A_{t-1})+\beta_2(\Delta S_t/A_{t-1})+\varepsilon \quad (1)$$

Where CFO_t is cash from operations, A_t is the total assets at the end of period t. S_t – the sales during period t, and ΔS_t is the difference between S_t and S_{t-1}.

After that, the computation of abnormal cash flow from operations takes place by deducting normal cash flow from operations estimated for the corresponding industry and firm-year from the actual cash flow from operations appraised in the previous step.

Next, in order to evaluate the abnormal performance as the real earnings management usage, the models of normal cost of goods sold, inventory, productions costs, and discretionary expenses are evaluated using Dechow, Kothari and Watts (1998) models. Firstly, the normal cost of goods sold is estimated by the model:

$$COGS_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta_1(S_t/A_{t-1})+\varepsilon \quad (2)$$

Where $COGS_t$ is the cost of goods sold, other designations – as above.

Normal inventory growth model looks as follows:

$$\Delta INV_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta_1(\Delta S_t/A_{t-1})+\beta_2(\Delta S_{t-1}/A_{t-1})+\varepsilon \quad (3)$$

Where ΔINV_t is the change in inventory, other designations – as above.

Production costs are defined as the sum of cost of good sold and change in inventory for the certain period and are represented by the latter equation:

$$PROD_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta_1(S_t/A_{t-1})+\beta_2(\Delta S_t/A_{t-1})+\beta_3(\Delta S_{t-1}/A_{t-1})+\varepsilon \quad (4)$$

Where $PROD_t$ is the production costs, other designations – as above.

Interestingly, the Dechow, Kothari and Watts (1998) model of discretionary expenses estimation is criticized due to the fact that if company is manipulating the income in a positive way, the proposed regression may show false decrease of discretionary expenses [Roychowdhury, 2006]. That is why the regression is modified by using the sales during previous period instead of sales during period t, and looks as presented below:

$$DISEXP_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta(S_{t-1}/A_{t-1})+\varepsilon \quad (5)$$

Where $DISEXP_t$ is the discretionary expenses, other designations – as above.

This model was used as a framework by many later studies, including Zang (2012), Choi, Choi and Sohn (2018), Zhang, Perols, Robinson and Smith (2018). All of them used models proposed by Roychowdhury in 2006 in order to determine whether company's managers are involved in real earnings management activities, but for different excuses, for example, to track the relationships between real and accrual-based techniques of earnings management, to evaluate the quality of auditors' inspections in companies taking part into income manipulations through real activities, or to estimate the effect of using REM on meeting or beating the expectations of analysts and investors.

Thus, model of Roychowdhury (2006) is one of the most popular models of assessing firms and companies involved in real earnings management. The model is well-known among modern researchers that use it widely in order to test presence of REM in different industries and countries or as a basis for developing new models of detecting real earnings management activities based on the new assumptions made. However, the assumptions underlying in the model of Roychowdhury (2006) may have some violations. For example, it assumes that there is an intra-industry homogeneity and revenues figure is the only source of determining optimal costs [Srivastava, 2019], which is not always the case because even within same industry companies my operate different, for example, due to the unique organizational structure.

1.4.2 Gunny's Model of Measuring Real Earnings Management

The other widely used model of detecting real earnings management by researchers is developed in 2010 by Gunny. She also citated and relied in her study on the real earnings management models developed Roychowdhury (2006). However, Gunny's research design has a unique specific, due to the fact that she takes into account the unlikelihood of assessment the intention of the manager to apply real earnings management that may lead to accidental discovery of REM in cases where it was not used. In order to eliminate this mistake, the Gunny model is applicable only on last year net income of firms that just met zero earnings due to the fact that they are more likely to be involved in REM.

Same as Roychowdhury (2006), Gunny states that the evidence of real earnings management's presence is conditioned by the appearance of abnormal figures in company's activities and reports. Thus, model includes the estimation of normal levels of expenses on research and development, selling, general and administrative expenses, gain on net asset sales, and production costs for every year and industry.

As for the R&D expenses, the normal level is defined as follows:

$$RD_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta_1 MV+\beta_2 Q_t+\beta_3(INT_t/A_{t-1})+\beta_4(RD_{t-1}/A_{t-1})+\varepsilon_t^{R\&D} \quad (6)$$

Where RD represents R&D expense, A is total assets, MV serves as the natural log of company's market value, Q represents Tobin's Q, which is equal to the company's market value divided by the cost of replacement its assets, and INT is the internal funds of the company.

In order to estimate the normal level of SG&A, the equation below is used:

$$SGA_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta_1 MV+\beta_2 Q_t+\beta_3(INT_t/A_{t-1})+\beta_4(\Delta S_t/A_{t-1})+\beta_5(\Delta S_t/A_{t-1})**DD+\varepsilon_t^{SG\&A} \quad (7)$$

Where SGA represents SG&A expense, and DD is a special variable indicator that is equal to 1 with the increase of total sales from t-1 to t or 0 otherwise, other designations – as above.

The normal level of gain on asset sales is defined using the following equation:

$$GainA_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta_1 MV+\beta_2 Q_t+\beta_3(INT_t/A_{t-1})+\beta_4(ASales_t/A_{t-1})+ +\beta_5(ISales_t/A_{t-1})+\varepsilon_t^{Asset} \quad (8)$$

Where GainA represents income from selling the company's assets, ASales is long-lived asset sales, and ISales serves as long-lied investment sales, that are transferred in order to make a relationship between the sales of assets and investments monotonic because negative figure if income from asset sales requires both sales of assets and investments to have negative signs as well, other designations – as above.

Computation of the normal level of company's production is held through the regression presented beneath:

$$PROD_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta_1 MV+\beta_2 Q_t+\beta_3(S_t/A_{t-1})+\beta_4(\Delta S_t/A_{t-1})+$$

$$+\beta_5(\Delta S_{t-1}/A_{t-1})+\varepsilon_t^{Production} \quad (9)$$

Where PROD represents sum of COGS and inventory's change, other designations – as above.

The companies that deviate from normal levels of activities described above are considered to have abnormal levels and are likely to be involved in applying real earnings management techniques. Thus, companies involved in R&D or SG&A real earnings management may be seen in the lowest quintile of abnormal R&D or SG&A expense, while companies suspected of Asset or Production real earnings management are placed in the highest quintile of abnormal gain on asset sales or production costs [Gunny, 2010].

Despite the necessity of collecting the complex dataset, model of detecting applying real earnings management developed by Gunny became quite popular among following researchers of income manipulations by real activities. Hereby, this model is included into the research of measuring real activity management by Cohen, Pandit, Wasley and Zach (2019). Also, parts of the Gunny model's, specifically expectation of R&D and SG&A, are used by Beyer, Nabar and Rapley (2018) in order to distinguish the usage of real earnings management by companies' managers to influence on its profitability in future firm-years.

1.4.3 Other Models of Measuring Real Earnings Management

Along with the increase of the popularity of studies on real earnings management, new models of detecting REM are developed. Despite referring to Roychowdhury (2006) and Gunny (2010) models, some researchers prefer to find their own unique way of measuring level of real earnings management used by companies and their managers.

One of these examples is model developed by Hashemi and Rabiee (2011) in order to evaluate the relationship between accrual-based and real earnings managements implications in companies based in Iran. Here, authors suppose that AEM and REM are interrelated actions, that is why previously developed models are not suitable in this case.

According to authors' hypothesis, REM is occurring before AEM, so equation of level of real earnings management looks as follows:

$$REM_{i,t}=\alpha_0+\alpha_1 PreEMUI_{i,t}+\alpha_2 DE_{i,t}+\alpha_3 Size_{i,t}+\alpha_4 Growth_{i,t}+\vartheta_{i,t} \quad (10)$$

Where REM represents level of real earnings management, PreEMUI is the unexpected income occurred before any earnings management, DE serves as a ratio of debt to total asset at the beginning of the current year, Size represents company's size as the natural logarithm of the total asset, and Growth is change of sales.

However, it would be wrong to deny that both type of earnings management may take part at the same period of time [Hashemi and Rabiee, 2011]. Due to the fact that previous model ignores usage of accrual-based earnings management, there is also other model to test whether the company is involved in REM along with AEM:

$$REM_{i,t}=\gamma_0+\gamma_1 PreEMUI_{i,t}+\gamma_2 AEM_{i,t}+\gamma_3 DE_{i,t}+\gamma_4 Size_{i,t}+\gamma_5 Growth_{i,t}+\tau_{i,t} \quad (11)$$

Where AEM represents level of accrual-based earnings management used by company during the studied period of time, other designations – as above.

These models of Hashemi and Rabiee (2011) are mostly useful when testing both real and accrual-based techniques of earnings management due to the fact that they allow to understand what type of earnings management company is involved into.

However, not all studies are designed in the way described above, such as determining the applying of real earnings management in several industries. Interesting research design was used by Chapman and Steenburgh (2011). They are focused on the one type of REM, promotions, and on one specific product using the data of the purchase patterns of 2,500 households in certain area in the US [Chapman and Steenburgh, 2011]. Thus, they are testing whether the purchases of the product are increasing during the discount offering.

The hypothesis that consumption of the product is manipulated through one of the marketing activities, such as special prices discounts, feature advertisements and aisle displays, is tested using following logistic regressions:

$$\Lambda(Action_{ist})= \alpha+ \beta_1 QuaterEnd_{ist} + \beta_2 YearEnd_{ist} + \beta_3 MissedPriorQEPS_{ist} *$$

$$*QuarterEnd_{ist} + \beta_4 MissedPriorQEPS_{ist} * YearEnd_{ist} + \sum_{j=1}^{12} \gamma_j Month_{ist\ j} + \epsilon_{ist} \quad (12)$$

$$\Lambda(Action_{ist}) = \alpha + \beta_1 QuaterEnd_{ist} + \beta_2 JustBeat_{ist} + \beta_3 JustBeat_{ist} * QuarterEnd_{ist} +$$

$$+ \sum_{j=1}^{12} \gamma_j \, Month_{ist\ j} + \epsilon_{ist} \quad (13)$$

Where Action represents one of the marketing actions, such as Special Price, Feature or Display that are dummy variables equal to one if the sales are affected by one of the actions, otherwise zero, QuaterEnd and YearEnd are dummy variables equal to one if the sale is taking place in the last quarter or month, otherwise zero, MissedPriorQEPS serves as the dummy variable equals to one if earnings per share for the previous period was equal to 80-100% of the previous year, otherwise zero, JustBeat represents a dummy variable equals to one if the reported earnings for the quarter are 0-10% higher than the analyst forecasts, otherwise zero, other designations – as above.

The model developed by Chapman and Steenburgh (2011) provides complete evidence on managers involved in REM through marketing activities, however, is focused on one and only type of REM and on one and only type of product and requires deep knowledges of certain product and strong understanding of marketing area.

Thereby, number of models of detecting usage of real earnings management by companies are constructed presently. The choice of a model for assessing REM activities in companies is mostly determined by the purpose and scope of the research, the availability of data and assumptions made by researchers, for this reason it is impractical to distinguish one model as the most correct one.

1.4.4 Modified Jones' Model of Measuring Accrual-Based Earnings Management

While talking about real earnings manipulations in companies, accrual-based manipulations cannot be ignored. It is crucial to take them into account because applying of AEM may alter REM estimation. The most popular model of measuring accrual-based earnings management is the model proposed by Jones in 1991. However, the Jones' model was developed quite long time ago and definitely has some flows due to not taking into account some modern aspects of reporting. Thus, model was optimized to meet the specific of modern world. Here, again as in previous models, the normal and abnormal figures are computed. The deviations of abnormal

figures from normal ones are considered to be the evidence of applying accrual-based earnings management in companies.

Firstly, total accruals are needed to be calculated. This calculation is developed by Jones itself and look as follows [Jones, 1991]:

$$TACC_t = \Delta CA_t - \Delta Cash_t - \Delta CL_t + \Delta DCL_t - DEP_t \quad (14)$$

Where TACC represents total accruals in year t, ΔCA is a change in current assets, ΔCash is determined as change in cash and cash equivalents, ΔCL is a change in a short-term debt included in current liabilities and DEP means depreciation and amortization expenses.

After that the modified model needs to be applied. The model is constructed by Dechow, Sloan and Sweeney (1995) and is presented below:

$$TACC_t/A_{t-1} = \alpha_1(1/A_{t-1}) + \alpha_2(\Delta REV_t - \Delta REC_t)/A_{t-1} + \alpha_3 PPE_t/A_{t-1} + \varepsilon_t \quad (15)$$

Where ΔREV is a change in revenues, ΔREC is represented by change in net receivables, PPE determines the gross property plant and equipment, other designations – as above.

Second step involves calculation of non-discretionary accruals. The formula of non-discretionary accruals looks as follow:

$$NDACC_t/A_{t-1} = \beta_1(1/A_{t-1}) + \beta_2(\Delta REV_t - \Delta REC_t)/A_{t-1} + \beta_3 PPE_t/A_{t-1} + \varepsilon_t \quad (16)$$

Where NDACC is the non-discretionary accruals, other designations – as above.

For now, modified Jones' model is one of the most reliable models that detect accrual-based earnings management. It helps to determine earnings manipulations through accrual activities and is used by modern researchers not only to detect AEM, but also to measure its impact on REM. For example, both Choi, Choi and Sohn (2018), and Baker, et al. (2019) used the model to detect usage of real earnings management from income manipulations by companies in general. Bergstresser and Philippon (2004), and Tangestani, Asgari and Jahed (2016) applied the model to investigate what are the incentives and limiting factors of applying real earnings management separating real activities and accrual-based ones. Moreover, Zang (2012) used the model to study

the relation and the trade-off between AEM and REM. Even Roychowdhury, forefather of real earnings management assessing model, refers to the Jones' model while constructing his own one in the research in 2006.

1.4.5 Hypotheses Development

There is a number of researches that study the dependence of real earnings management, and sometimes even its instruments, on various factors. These factors might be the industry that company is operating in, company's size, size of its board, market-to-book ratio, ROE, ROA, debt-to-equity ratio, company's current liabilities, whether the company is planning the IPO, and many other different factors. Choosing the factor and formulating the hypothesis depends on the research goal of the study.

Thus, Charfeddine et al. (2013) studied the determinants of earnings management in general. They studied the relations between earnings management and its incentives, such as indebtedness, size and stock market returns, and constraints, such as size of the board administration, cumulation of the CEO and chairman of the board functions, managerial ownership, majority ownership, external audit quality and dividend policy. Overall, their study tested nine following hypotheses:

H1: Indebtedness is positively related to earnings management.

H2: Firm size is negatively related to earnings management.

H3: Firms with low performance are more intended to manage earnings.

H4: The size of the board of directors negatively influences earnings management practice.

H5: Earnings management is more important in case of cumulation of manager and board chair roles.

H6: Earnings management is less important when managers are shareholders in their firms.

H7: Earnings management is less important in case of high ownership concentration.

H8: Control by auditors belonging to 'Big Four' may limit earnings management.

H9: Dividend policy is negatively related to earnings management.

After the research has been conducted, out of all nine hypotheses only H1, H3 and H9 has been accepted by researchers.

As for the real earnings management itself, the Roychowdhyry (2006) proved following hypotheses in his research:

H1. After controlling for sales levels, suspect firm-years exhibit at least one of the following: unusually low cash flow from operations (CFO) OR unusually low discretionary expenses.

H2. After controlling for sales levels, suspect firm-years exhibit unusually high production costs.

H3. Suspect firm-years in manufacturing industries exhibit higher abnormal production costs than other suspect firm-years.

H4. Suspect firm-years with debt outstanding exhibit abnormal production costs that are higher, and abnormal discretionary expenses that are lower than other suspect firm-years.

H5. Suspect firm-years with high market-to-book exhibit abnormal production costs that are higher than, and abnormal discretionary expenses that are lower than, other suspect firm-years.

H6. Suspect firm-years with high current liabilities as a percentage of total assets exhibit abnormal production costs that are higher than, and abnormal discretionary expenses that are lower than, other suspect firm-years.

H7. Suspect firm-years with a high level of inventories and receivables as a percentage of total assets exhibit abnormal production costs that are higher than other suspect firm-years.

H8. Suspect firm-years with high institutional ownership exhibit abnormal production costs that are lower, and abnormal discretionary expenses that are higher than other suspect firm-years.

Researches on earnings management and its relationships with different factors provide evidence that the level of earnings management is more likely to be higher in the small-sized companies. This fact was proven for the accrual-based earnings management by Jones (1991), while he was testing the determinants of earnings management in the US firms. As for the real earnings management, its relationships with company's size were studied by Roychowdhury (2006), Comporek (2020), etc. All of them state that the amount of earnings manipulations through real activities in negatively depends on the size of the company. If the total REM negatively depends on the size of the company, then sales operations REM and discretionary expenses REM would have reverse dependence from size. Thus, first group of hypotheses formulated for the research is as follows:

H1a: Larger Russian companies are more likely to use real earnings management through sales operations.

H1b: Larger Russian companies are less likely to use real earnings management through overproduction.

H1c: Larger Russian companies are more likely to use real earnings management through discretionary expenses reduction.

The relationships between company's sales growth and real earnings management are also described in previous researches. Usually, companies with high increase in sales are not likely to manipulate earnings management due to already improving performance situation. Again, if theamount of total REM negatively depends on the sales growth, than sales operations REM and discretionary expenses REM would have positive dependence from size. So, according to Comporek (2020), Zhang, Hashemi and Rabiee (2011), second group of hypotheses is formulated:

H2a: Russian companies with a positive sales growth are more likely to use real earnings management through sales operations.

H2b: Russian companies with a positive sales growth are less likely to use real earnings management through overproduction.

H2c: Russian companies with a positive sales growth are more likely to use real earnings management through discretionary expenses reduction.

As for the performance indicator, the most common one used by real earnings management researchers is return on assets. Choi and Sohn (2018), along with Cohen, Pandit, Wasley and Zach (2019) provide evidence on positive dependence of real earnings management and low performance. Taking into account the reverse relationships of total REM with overproduction REM and discretionary expenses REM, third bundle of hypotheses is formulated as follows:

H3a: Russian companies with lower performance are less likely to use real earnings management through sales operations.

H3b: Russian companies with lower performance are more likely to use real earnings management through overproduction.

H3c: Russian companies with lower performance are less likely to use real earnings management through discretionary expenses reduction.

The last determinant of real earnings management that is appropriate for the companies operating in the Russian market is the indebtedness of the company that is presented as leverage, debt-to-equity ratio, as it was proposed by Charfeddine et al. (2013). Evidence of past studies shows that companies with high debt-to equity ratio are more likely to be involved in REM activities [Hashemi and Rabiee, 2011]. Repeatedly, if the total REM positively depends on the

leverage of the company, then sales operations REM and discretionary expenses REM would have negative dependence from leverage. Hence, the last group of hypotheses is:

H4a: Russian companies with higher portion of debt are less likely to use real earnings management through sales operations.

H4b: Russian companies with higher portion of debt are more likely to use real earnings management through overproduction.

H4c: Russian companies with higher portion of debt are less likely to use real earnings management through discretionary expenses reduction.

It is important to mention that the difference in hypotheses for overproduction REM and other instruments of REM is due to the reverse relationships between total REM and both sales operations and discretionary expenses real earnings management instruments, because companies involved in REM activities through these instruments have negative values of abnormal CFO and discretionary expenses. Thus, if the positive dependence of total REM on the variable is expected, the positive dependence of overproduction is expected as well, while the relations of the variable and both sales operations and discretionary expenses reduction should be negative, and vice versa.

Chapter 2. Empirical Study of the Instruments of Real Earnings Management Applied by Russian companies

2.1 Research Methodology

2.1.1 Data Collection

The research is meant to provide information on what instruments of real earnings management are used among managers in Russian companies and what are the determinants of applying them. The data is collected from Spark and Skrin databases, together with manually collected data from the annual financial reports published on the companies' official websites. As far as Russian companies are able to provide different types of reporting, the main criterion for the data choosing is the availability of data on Russian companies in the form of International Financial Reporting Standards (IFRS) in order to collect as many comparable firm-years as possible.

The initial sample collected consisted of 254 Russian companies. However, after detecting the outliers based on the figures of companies' sizes, sales growth, return on assets and leverage, and excluding them from the sample, number of inspected companies was reduced. The chosen period for the observation is 8 years from 2012 to 2019, which is the maximum possible period that may be used in the moment of conducting the research. Chosen period is determined by the fact that the International Financial Reporting Standards were proposed in Russian Federation in the "Regulations on the recognition of IFRS and their clarifications for application on the territory of the Russian Federation" by the Government of the Russian Federation in 2011. According to this document, companies stated in the Regulation are obliged to provide IFRS reporting starting from the year 2012. So, there is a very small number of companies that provided IFRS reporting before the year 2012.

As far as there are quite many industries in the subset and each of them has its own specifics it is not fully right to study the dataset as a one thing. Therefore, the dataset is divided on two subsets based on the company's activity. First subset consists of the companies which main activity is to produce or manufacture physical goods. Second subset consists of the companies which main activity is to provide different kinds of services.

List of companies used for the analysis is presented in the Appendix 1.

2.1.2 Empirical Models and Variables

After the studying models of measuring earnings management that were described in the previous chapter, the most appropriate model that helps to determine the usage of real earnings management is chosen.

This model is the Roychowdhury (2006) model. Comparing to others, especially to the Gunny (2010) model, this model does not require lots of financial indicators, which are quite hard to find for Russian companies. Moreover, some models, such as Gunny (200) model, include company's market value. As far as this information is not published for the companies that are not traded on the exchange, usage of these models would lead to the very small sample. Since the industry is taken into the account, the results of these models would not be representative and reliable, because it would include only several companies for some of the industries.

So, in order to provide the best and most complete possible results the Roychowdhury (2006) model is used to show what are the instruments of real earnings management applied by Russian companies. Roychowdhury (2006) model allows to study several instruments of real earnings management separately. So, each instrument is determined by individual econometric model.

The abnormal level of cash flow from operations (CFO_REM) represents the residual component that show the carve of operational cash flows with the help of sales revenues and change in sales revenues as exogenous variables. The equation is shown below:

$$CFO_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta_1(S_t/A_{t-1})+\beta_2(\Delta S_t/A_{t-1})+\varepsilon \quad (17)$$

Where CFO_t is the cash flow from operations in year *t*, A_t is the total assets at the end of period *t*, S_t – the sales during period *t*, ΔS_t is the difference between S_t and S_{t-1}, α and β denotes specific regression coefficients, ε is an error term.

If the company's CFO_REM deviates significantly negatively from 0, it means that the company is involved in earnings manipulations through changing the volume of sales and temporarily increasing the turnover through some kind of trade credits or providing price discounts.

Production costs (PROD_REM) are defined as the sum of cost of goods sold and change in inventory for the certain period and are represented by the latter equation:

$$PROD_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta_1(S_t/A_{t-1})+\beta_2(\Delta S_t/A_{t-1})+\beta_3(\Delta S_{t-1}/A_{t-1})+\varepsilon \quad (18)$$

Where $PROD_t$ is the production costs, other designations – as above.

If the PROD_REM is positive figure, then the company uses earnings manipulations through overproduction that allows to allocate the expenses on producing goods to the bigger number of produced.

Due to the lack of data, level of discretionary expenses (DISEXP_REM) is represented by the R&D expenses. The equation is as follows:

$$DISEXP_t/A_{t-1}=\alpha_0+\alpha_1(1/A_{t-1})+\beta(S_{t-1}/A_{t-1})+\varepsilon \quad (19)$$

Where $DISEXP_t$ is the discretionary expenses, other designations – as above.

Negative values of DISEXP_REM are considered to be the evidence of delaying discretionary expenses.

The overall level of real earnings management (T_REM) for the firm-year is defined by Cohen & Zarowin (2010) and looks as follows:

$$T\_REM_t = -CFO\_REM_t + PROD\_REM_t - DISEXP\_REM_t \quad (20)$$

So, T_REM consists of the sum of PROD_REM, and multiplied by -1 CFO_REM and DISXEP_REM. The multiplication takes place due to the fact that firms involved in real earnings management through sales manipulation or delaying discretionary expenses have negative values of these indicators. So, T_REM defines the level of real earnings management used by certain company, the higher the figure, the more involved in real earnings management the firm is.

Accrual-based earnings management needs to be taken into account as well, ignoring it may lead to the misinterpretation of the results. For this, the modified Jones (1991) model is chosen due to its applicability for the collected sample.

The level of total accruals (TACC_AEM) represents the residual component that show the carve of total accruals through the changes in sales and in net receivables, and gross PP&E as exogenous variables. The equation is shown below:

$$TACC_t/A_{t-1} = \alpha_1(1/A_{t-1})+\alpha_2(\Delta S_t - \Delta REC_t)/A_{t-1}+\alpha_3 PPE_t/A_{t-1}+\varepsilon_t \quad (21)$$

Where TACC is total accruals calculated as net income minus cash flows from operations, ΔS is a change in sales, ΔREC is represented by change in net receivables, PPE determines the gross property plant and equipment, other designations – as above.

The calculation of discretionary accruals (DACC_AEM) is calculated through the model of Zang (2011) presented further:

$$DACC_t = \alpha_0 + \alpha_1 T\_REM_t + \alpha_2 SIZE_t + \alpha_3 SG_t + \alpha_4 ROA_t + \alpha_5 LEV_t+\varepsilon_t \quad (22)$$

Where DACC is discretionary accruals, LEV represents the debt-to-equity ratio, SG is the sales growth, ROA represents the returns on assets ratio, other designations – as above.

After that, the same method is applied for each instrument of real earnings management to study what are the determinants of using this or that instrument of REM by Russian companies. These models are based on the models that were developed by Comporek in his article published in 2020, however they are slightly modified in order to test the hypothesis of the research. Thus, the relation between REM instruments and control variables are studied by the equations presented below:

$$T\_REM_t = \alpha_0 + \alpha_1 SIZE_t + \alpha_2 SG_t + \alpha_3 ROA_t + \alpha_4 LEV_t + \varepsilon_t \quad (23)$$

$$CFO\_REM_t = \alpha_0 + \alpha_1 SIZE_t + \alpha_2 SG_t + \alpha_3 ROA_t + \alpha_4 LEV_t + \varepsilon_t \quad (24)$$

$$PROD\_REM_t = \alpha_0 + \alpha_1 SIZE_t + \alpha_2 SG_t + \alpha_3 ROA_t + \alpha_4 LEV_t + \varepsilon_t \quad (25)$$

$$DISEXP\_REM_t = \alpha_0 + \alpha_1 SIZE_t + \alpha_2 SG_t + \alpha_3 ROA_t + \alpha_4 LEV_t + \varepsilon_t \quad (26)$$

Where SIZE is the size of the company, SG represents the sales growth, ROA means the return on assets, LEV debt-to-equity ratio, other designations are the same as above.

The control variables are added to control other factors that may bias the explanation of usage of certain type of real earnings management's instruments. Further the proper explanation of each variable is presented.

SIZE is a control variable for the company's size. It is calculated as a natural logarithm of total assets. The variable controls the impact of the company's size on the models as far as all types of companies are taken for the research, such as small, medium and large companies.

LEV is a control variable for the level of leverage. It is presented as debt divided by equity. The variable controls the impact of the company's debt-to-equity ratio on the constructed models' coefficients.

SG is a control variable for the company's sales growth. Sales growth here is a change in company's sales in period t comparing to the previous period (t-1). It is presented in a form of percentage.

ROA is a control variable for the company's returns on assets. It is calculated as net income divided by total assets. The variable controls the impact of the company's efficiency in the usage of its assets.

Each model is constructed for each of two subsets separately, as far as it was decided to split the original dataset due to the incomparability of companies with different activities, such as producing physical goods and providing services.

2.2 Empirical Results and Discussion

2.2.1 Sample and Subsets Description

The final sample consists of 1064 firm-year observations of 133 Russian-owned companies for 8 years from 2012 to 2019. Sample is divided into two subsets based on the area of the company's activity. First subset of companies producing goods consists of 712 firm-year observations of 89 companies, and second subset of companies providing services consists of 352 firm-year observations of 44 companies.

The companies in the original data sample operates within 14 industries. The distribution of the data between industries is not equal, because the IFRS reporting on Russian companies is very limited. Industries with less than 5 companies were excluded from the sample due to the impossibility to provide significant results on the very small number of observations.

The data was divided into two subsets based on the activity of the companies. First subset consists of companies that produce some sorts of goods. These companies are involved into manufacturing of industrial goods, extraction and production of basic resources, production of electricity, gas and water, mining of oil and gas, chemical production, production of food and beverage, and production of building materials. Second subset consists of companies that provide different services. These companies are the ones that operate within distribution of electricity, gas and water, telecommunication, health and retail industries, food and beverage services, real estate, and tourism and media services. The first subset is larger than the second one (67% and 33% respectively) due to the specific of the data and criteria of choosing the data.

Table 1 represents the distribution of the companies from the first subset of companies producing goods according to the industry. Most of the companies in the subset manufacture the industrial goods (27% of the subset). Second largest industry of the subset is represented by companies that extract and produce basic resources (19% of the subset). Representatives of production of electricity, gas and water industry occupy 16% of the subset. Companies that extract oil and gas represent 13%, while companies that involved in chemical industry are the 12% of the subset. Companies involved in producing food and beverage are in charge of 8% of the subset each. Firms that operate in the industry of production of building materials represent 5% of the subset.

Table 1. Industries Distribution in Producing Goods Subset

Industry	**% of companies**
Manufacturing of industrial goods	27%
Extraction and production of basic resources	19%
Production of electricity, gas and water	16%
Mining of oil and gas	13%
Chemical industry	12%
Food and beverage industry	8%
Production of building materials	5%
Total	100%

Source: the author

Table 2 shows the distribution of the companies from the second subset of companies providing services according to the industry. Major part of the subset is represented by the companies involved in the distribution of electricity, gas and water. Companies operating in this

industry take almost half of the subset (46%). Companies that provide telecommunication services represents the 19% of the subset, while retail and health industries stand for 10% and 7% of the subset respectively. Companies that provide services in food and beverage industry and real estate show 5% of the subset each, and tourism and media services are in charge of 4% each.

Table 2. Industries Distribution in Providing Services Subset

Industry	**% of companies**
Distribution of electricity, gas and water	46%
Telecommunication industry	19%
Retail industry	10%
Health industry	7%
Food and beverage industry	5%
Real estate	5%
Tourism industry	4%
Media services	4%
Total	100%

Source: the author

In order to check whether the subsets are good for the analysis, the histograms showing the size of companies is constructed. Figure 1 represents the histogram of companies producing goods sizes. It can be seen that the histogram is slightly skewed to the right. It means that sample contains small-sized companies that drive the mean of companies' size downward. These companies were not determined as the outliers, as far as the distribution looks mostly normal and these small-sized companies are crucial for the study. Moreover, the majority of the sample is medium-sized companies, which makes the sample representative.

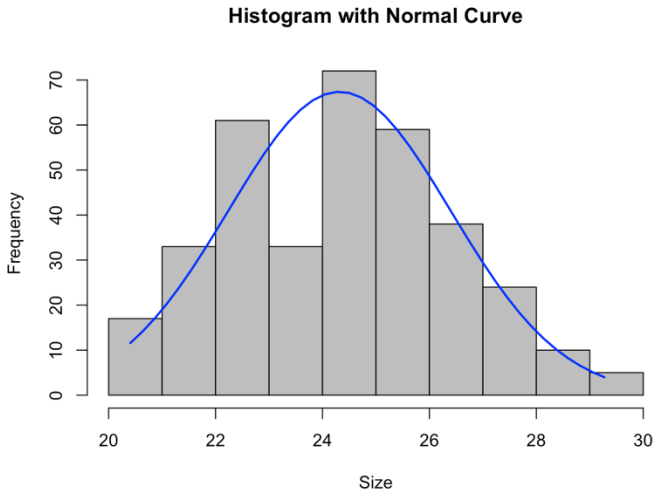

Figure 1. Producing Goods Subset distribution according to Size variable

Source: the author

Mostly same situation is presented in Figure 2 that shows sizes of the companies that provide different services. However, it is not skewed, so the distribution is quite normal. So, the second subset consists of all types of companies, the majority is middle-sized companies, which means that the subset is representative as well.

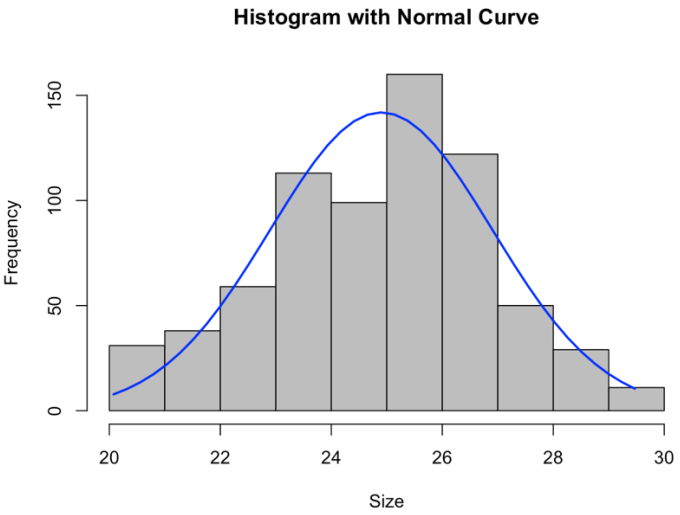

Figure 2. Providing Services Subset distribution according to Size variable

Source: the author

Descriptive statistics of each subset is shown in the Table 3 and Table 4. In order to get figures that are easier to read all figures are presented as the natural logarithms. Table 3 represents the mean, minimum, maximum values, standard deviation and number of observations for total assets, sales, cash flow from operation, production costs and discretionary expenses of companies that produce goods. Table 4 consists of the same information, but of the companies whose main activity is producing services.

The figures of both subsets are quite similar in general. Even after getting rid of outliers, the ranges are quite wide, it is due to the fact that the sample consists of companies of different sizes and industries. It can also be seen that standard deviation of production and discretionary expenses are high compared to the others. Thus, reported production costs and discretionary expenses are volatile. Standard deviations of other figures of the sample, such as total assets, sales and CFO are much lower.

However, second subset's figures are mostly lower than the ones of the first subsample. It is possible to say that, in general, subset with companies providing services consists of companies that have lower values of total assets, sales, cash flows from operation, production costs and discretionary expenses. Anyway, the difference between two subsets is not that significant.

Table 3. Descriptive Statistics of Producing Goods Subset

	Total assets	**Sales**	**Cash flows from operations**	**Production costs**	**Discretionary expenses**
Mean	10,8143	10,6326	9,6981	7,2401	4,3710
Minimum	8,7185	8,2536	6,4278	7,5185	5,2856
Maximum	12,7986	12,9091	12,0614	12,2650	11,3919
Standard Deviation	0,8694	0,8705	1,0821	4,6007	4,4877
Observations	712	712	712	712	712

Source: the author

Table 4. Descriptive Statistics of Providing Services Subset

	Total assets	**Sales**	**Cash flows from operations**	**Production costs**	**Discretionary expenses**
Mean	10,5612	10,5446	9,4561	6,7722	3,6579
Minimum	8,8627	8,1933	6,0660	5,1875	4,5051
Maximum	12,7130	12,3992	11,6751	12,1910	11,1450
Standard Deviation	0,9051	0,8503	1,1069	4,7616	4,4091
Observations	352	352	352	352	352

Source: the author

Sample descriptive statistics and more detailed descriptive statistic for each subset are presented in the Appendix 2.

After the calculation of normal levels of each real earnings management indicator such as CFO, production costs and discretionary expenses, the abnormal level for each of them was calculated using the Roychowdhury (2006) models. It has been found that abnormal values for each instrument are present in the data, so Russian companies may use sales manipulations, overproduction and reduction of discretionary expenses as the REM instruments.

2.2.2 Descriptive Statistics of Variables

Table 5 and Table 6 represents the descriptive statistics of variables for each subset. Size of the company does not vary much in both subsets, as in production goods subset the minimum is 20,08, maximum is 29,47, and the mean is 24,9, while in providing services subset size variable has the minimum is 20,41, maximum is 29,27, and the mean is 24,32. As for the sales growth, its minimum is negative in both subsets (-0,37 and -0,31 for production goods and providing services subsets respectively), maximum is positive (1,4 and 1,23), mean equals to 0,21 and 0,2, which means that in general sales of studied subsets are mostly stable. Returns on assets in their turn have not that high rage as well. Returns on assets' minimum figures are positive and almost equals to 0 in both subsets, maximums are 0,32 and 0,24 for production goods and providing services subsets respectively and means equal to 0,05 and 0,03. Different situation is seen in leverage, its range is wide in both subsets. For production goods subset leverage minimum is 0,0005, maximum is 38,32, and mean is only 1,17. Same situation is present in production goods subset, as far as its leverage minimum is 0,0006, maximum is 39,87, and mean is only 1,98.

The standard deviations of both size and leverage are quite big comparing to the ones of sales growth and ROA. This fact means that the each of two subsets has volatile figures of both size and debt-to-equity ratio.

Table 5. Descriptive Statistics of Producing Goods Subset Variables

	SIZE	**SG**	**ROA**	**LEV**
Mean	24,9009	0,2118	0,0451	1,1678
Minimum	20,0752	-0,3694	0,0002	0,0005
Maximum	29,4699	1,3957	0,3145	38,3245
Standard Deviation	2,0020	0,3534	0,0758	2,7670
Observations	712	712	712	712

Source: the author

Table 6. Descriptive Statistics of Providing Services Subset Variables

	SIZE	SG	ROA	LEV
Mean	24,3180	0,1966	0,0277	1,9781
Minimum	20,4072	-0,3117	0,0008	0,0006
Maximum	29,2727	1,2286	0,2433	39,8740
Standard Deviation	2,0841	0,3439	0,0624	4,1897
Observations	352	352	352	352

Source: the author

Sample descriptive statistics of variables and more detailed descriptive statistic of variables for each subset are shown in the Appendix 3.

Table 7 and Table 8 consist of the information on the correlation between the variables. There is no evidence of strong correlation between any variables in any subset. The correlation between company's size and the sales growth is negative and quite low in both subsets (-0,046 and -0,05 for production goods and providing services subsets respectively). So, studied companies have little dependence of their sales growth on the size and vice versa. The correlations between company's size and returns on assets and leverage have different situations in subsets. The correlation between size and ROA in production goods subset is much higher than in providing services subset (0,176 and 0,076 respectively), while correlation between size and leverage in production goods subset is less significant than in providing services subset (-0,028 and -0,17 respectively). Pearson's correlation between company's sales growth and returns on assets is positive but mostly insignificant in both subsets (0,054 and 0,031), which means that company's effectiveness in using its asset does not depend on its change in sales. Sales growth and leverage, conversely, have small negative correlation (-0,045 and -0,041). Thus, increase in sales may leads to the very small reduction in leverage for companies in both subsets. As for the ROA and leverage, its Pearson's correlation is low and negative in both subsets and is equal to -0,028 and -0,086. So, increase of company's productivity of using its assets leads to the small increase of debt-to-equity ratio. No significant correlation between variables is detected in both subsets.

Table 7. Pearson's Correlation between of Producing Goods Subset Variables

	SIZE	SG	ROA	LEV
SIZE	1			
SG	-0,0459673	1		
ROA	0,17618019	0,05401183	1	
LEV	-0,0227392	-0,0453453	-0,0281954	1

Source: the author

Table 8. Pearson's Correlation between of Providing Services Subset Variables

	SIZE	SG	ROA	LEV
SIZE	1			
SG	-0,0499081	1		
ROA	0,07615874	0,03085021	1	
LEV	-0,1695514	-0,0409788	-0,0860788	1

Source: the author

2.2.3 Models' Results

Further, the results of dependence of real earnings management in general and each of its instrument separately on the control variables (size of the company, sales growth, return on assets, and debt-to-equity ratio) are presented for each subset.

Each dependance has been tested with different types of models, such as fixed effect model, random effect model and pooled least squares model. Each model has been tested using specific tests (Lagrange Multiplier Test, F Test, Hausman Test) in order to choose the most appropriate model. Based on the results of these tests and p-values that state whether the model is significant in general or not, the most appropriate models for total REM level, each its instrument and each subset were chosen. More detailed results on choosing the most appropriate models are presented in the Appendix 4.

All models were tested, whether there are any issues present, such as autocorrelation between the variables or any critical values of multicollinearity. Pearson's correlation matrix between the variables is presented in the previous part of the study.

After that, Variance Inflation Factor (VIF) tests were conducted in order to test whether there is any multicollinearity present in the models, it is presented in the Table 9. It can be seen that VIF values for each variable are quite low, as far as each VIF is slightly bigger than 1. Therefore, models have no multicollinearity, there are no variables that are highly correlated with the predictors of constructed models.

Table 9. VIF Test Results

		SIZE	SG	ROA	LEV
VIF test	**Producing Goods Subset**	1,035772	1,008173	1,036656	1,003154
	Providing Services Subset	1,037347	1,006011	1,012426	1,037709

Source: the author

All the models built shows different, still quite good results. The results for each subset are presented in the Tables 10 and 11, that contains coefficients and t-statistics for each variable including the intercept, and goodness-of-fit that consists of Adjusted R^2 and F-statistics for each model constructed – T_REM, CFO_REM, PROD_REM, DISEXP_REM.

Thus, Table 10 contains information of regression results of real earnings management instruments for the production goods subset.

Table 10. Producing Goods Subset REM Regressions' Results

	T_REM		CFO_REM		PROD_REM		DISEXP_REM	
Variables	**Coef.**	**t-stat**	**Coef.**	**t-stat**	**Coef.**	**t-stat**	**Coef.**	**t-stat**
Intercept	-0,976	-3,931 ***	-	-	-	-	0,049	1,437
SIZE	0,042	4,202 ***	0,005	0,573	-0,035	-1,286	0,001	0,631
SG	0,025	0,441	0,019	2,830 **	0,005	0,224	0,003	2,397 *
ROA	0,888	3,371 ***	-0,350	-9,538 ***	-0,344	-2,871 **	-0,056	-1,557
LEV	0,004	0,600	0,001	0,196	0,001	0,059	0,001	1,271
Adjusted R^2	0,425		0,639		0,292		0,3693	
F-statistic	8,882		24,142		2,659		3,212	
Observations	712		712		712		712	
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1								

Source: the author

T_REM model is the pooling OLS model for Russian Producing Goods subset that show the dependence of overall REM level on Size, Sales Growth, ROA and Leverage. Adjusted R^2 is equal to 0,425, so 42,5% of the variance in total REM of studied subset is described by the chosen variables. F-statistics is equal to 8,882 and its p-value is less than 0,01, so the model is significant.

The equation for Total REM level for production goods subset is presented below:

$$T\_REM = -0{,}976 + 0{,}042SIZE + 0{,}025SG + 0{,}888ROA + 0{,}004LEV \quad (27)$$

All coefficients of the model are positive. So, one unit increase in company's size leads to the 0,042 increase in overall REM level, one unit rise in sales growth results in 0,025 increase in total REM. As for the ROA, it as the highest coefficient, so one unit increase in ROA rise T_REM in 0,888, while one unit positive change in leverage will lead to the increase of total REM on only 0,004.

The significance of the coefficients is shown by the t-statistics, and it shows that there are only two variables with p-value less than 0,05. These variables are Size and ROA, while SG and Leverage are not significant.

CFO_REM model is the fixed effects model, it represent the dependence of CFO level of real earnings management applied by Russian companies that produce products from Size, Sales Growth, ROA and Leverage. Its Adjusted R^2 equals to 0,639, which means that 63,9% of the variance in the total level of real earnings management used by Russian producing companies is explained by the chosen variables. F-statistic is equal to 24,142 with p-value less than 0,01. So, constructed model is significant in general.

The equation for CFO real earnings management level for production goods subset looks as follows:

$$CFO\_REM = 0{,}005SIZE + 0{,}019SG - 0{,}35ROA + 0{,}001LEV \quad (28)$$

This equation presents that one unit increase in Size will rise CFO REM in 0,005, Sales Growth will result in 0,019 increase in CFO level of real earnings management. Also, one unit increase in ROA will decrease level of CFO real earnings management in 0,35 units, and one unit increase in Leverage will lead to the 0,001 rise in CFO's level of real earnings management.

The significance of the coefficients that is presented by the t-statistics shows that there are three variables with p-value less than 0,05. These variables that have significant relationship with the level of CFO REM are Sales Growth and Returns on Assets, while Size and Leverage do not have any significant relationships with CFO level.

PROD_REM is a fixed effect model that shows the dependence of Production Costs level of Russian companies on Size, Sales Growth, ROA and Leverage. Adjusted R^2 equals to 0,292, which means that 29,2% of the variance in the overproduction level of Russian companies

producing goods are explained by the model's variables. Due to the fact that F-statistic is equal to 2,659 and its p-value is 0,032, this model is significant.

The equation for Production real earnings management level for production goods subset is presented below:

$$PROD\_REM = -0{,}035SIZE + 0{,}005SG - 0{,}344ROA + 0{,}001LEV \quad (29)$$

This means that one unit increase in Size will result in 0,035 decrease in real earnings management through overproduction, while one unit increase in ROA will decrease level of overproduction on 0,344. One unit increase in Sales Growth will rise production REM on 0,005, and one unit increase in Leverage will lead to the 0,001 increase in production level of REM.

The significance of the coefficients that is presented by the t-statistics differs from the previously described model. However, ROA variable is significant in the Production REM model. Another variables, Size, Sales Growth and Leverage are the insignificant ones.

DISEXP_REM pooling OLS model represent the dependence of level of real earnings management through reduction of discretionary expenses by Russian companies producing goods from Size, Sales Growth, ROA and Leverage. It has Adjusted R^2 equals to 0,369, which means that 36,9% of the variance in the real earnings management by discretionary expenses used by Russian production companies is explained by these variables. Its F-statistic is equal to 3,212 with the p-value equals to 0,001. Thus, the model is significant in general.

So, the equation for Discretionary Expenses real earnings management level for production goods subset looks as follows:

$$DISEXP\_REM = 0{,}049 + 0{,}001SIZE + 0{,}003SG - 0{,}056ROA + 0{,}001LEV \quad (30)$$

The equation above shows that one unit increase in Size will lead to 0,001 increase in abnormal discretionary expenses' level, and one unit increase in Sales Growth will result in 0,003 increase in discretionary expenses REM, while one unit increase in Leverage will increase discretionary expenses REM on 0,001. On the other hand, one unit increase in ROA will lead to the 0,056 decrease in level of real earnings management through discretionary expenses.

The significance of the coefficients is presented by the t-statistics. T-test shows that Sales Growth variable is significant, as far as its p-value is less than 0,05. Other variables have no significant relationship with level of real earnings management through discretionary expenses of production subset.

The regression results of real earnings management instruments for the providing services subset are presented in the Table 11.

Table 11. Providing Services Subset REM Regressions' Results

	T_REM		CFO_REM		PROD_REM		DISEXP_REM	
Variables	**Coef.**	**t-stat**	**Coef.**	**t-stat**	**Coef.**	**t-stat**	**Coef.**	**t-stat**
Intercept	-3,297	-4,080 ***	-0,307	-1,128	-3,205	-2,525 *	-	-
SIZE	0,134	4,100 ***	0,014	1,265	0,124	2,405 *	-0,214	-2,781 **
SG	-0,013	-0,068	0,045	0,687	0,135	2,841 **	0,121	2,001 *
ROA	-2,512	-2,320 *	-1,388	-3,803 ***	-0,306	-0.935	0,618	1,506
LEV	0,001	0,047	0,001	0,126	0,007	1,431	0,011	1,749
Adjusted R^2	0,472		0,326		0,249		0,821	
F-statistic	5,343		3,953		13,512		5,096	
Observations	352		352		352		352	
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1								

Source: the author

T_REM model is also the pooling OLS model for Russian services companies. The models shows that 47,2% of the variance of overall REM level is described by Size, Sales Growth, ROA and Leverage, as far as adjusted R^2 is equal to 0,472. Model's F-statistics is equal to 5,343 and its p-value is less than 0,01, so the model is significant in general.

The equation for Total REM for providing services subset is presented further:

$$T\_REM = -3{,}297 + 0{,}134SIZE - 0{,}013SG - 2{,}512ROA + 0{,}001LEV \quad (31)$$

Therefore, one unit increase in company's size will lead to the 0,134 increase in overall REM level, and one unit increase in sales growth results in 0,013 fall in total REM. One unit increase in ROA will decline T_REM on 2,512, at the same time, one unit positive change in leverage will lead to the small increase of total real earnings management level on 0,001.

The t-statistics that shows the significance of the coefficients provides similar results as for the producing goods subset, there are only two variables with p-value less than 0,05, which are Size and ROA. Sales Growth and Leverage are not significant.

CFO_REM model represent the pooling OLS regression dependence of CFO real earnings management applied by Russian service companies from Size, Sales Growth, ROA and Leverage. It has Adjusted R^2 equals to 0,326, which means that 32,6% of the variance in the CFO real earnings management level used by Russian companies providing services is explained by the constructed model. F-statistic is equal to 13,528, while its p-value is less than 0,01, which means that the model is significant in general.

Thus, the equation for total real earnings management level for providing services subset is presented further:

$$CFO\_REM = -0{,}307 + 0{,}014SIZE + 0{,}045SG - 1{,}388ROA + 0{,}001LEV \quad (32)$$

The equation shows that one unit increase in Size will lead to 0,014 increase in CFO real earnings management, and one unit increase in Sales Growth will result in 0,045 increase in CFO REM. At the same time, one unit increase in ROA will decline CFO REM on 1,388, while one unit increase in Leverage will lead to the 0,001 increase in cash flow real earnings management.

As for the significance of the coefficients, it is presented by the t-statistics. T-test shows that only ROA variable is significant, as far as its p-value is less than 0,05. Other variables have no significant relationship with level of CFO real earnings management.

PROD_REM model is a random effect model that describes the dependence of Production Costs level of Russian companies that provide different kinds of services on Size, Sales Growth, ROA and Leverage. Adjusted R^2 equals to 0,249, which means that 24,9% of the variance in the overproduction level of the subset are explained by the model's variables. F-statistic is equal to 13,528 and its p-value is less than 0,01, the constructed model is significant.

The equation for Production real earnings management level for providing services subset is shown below:

$$PROD\_REM = -3{,}205 + 0{,}124SIZE + 0{,}135SG - 0{,}306ROA + 0{,}007LEV \quad (33)$$

Therefore, one unit increase in Size will result in 0,124 increase in overproduction REM, while one unit increase in Sales Growth will increase level of overproduction on 0,135, and one unit increase in Leverage will lead to the 0,007 unit rise in the overproduction level. ROA variable has negative coefficient, so, one unit increase in ROA will decrease REM through overproduction on 0,306.

The significance of the coefficients presented by the t-statistics shows that in the PROD_REM model Size and Sales Growth are significant, while ROA and Leverage are not significant variables.

DISEXP_REM model shows fixed effect model of the relationships of level of real earnings management through reduction of discretionary expenses by Russian services companies and Size, Sales Growth, ROA and Leverage. The Adjusted R^2 is 0,821, so 82,1% of the variance in the discretionary expenses real earnings management used by Russian service companies is explained by the model. F-statistic is equal to 5,096, while its p-value is less than 0,01. Therefore, the constructed model of discretionary expenses real earnings management for providing services subset is significant.

So, the equation for Discretionary Expenses REM level for providing services subset looks as follows:

$$DISEXP\_REM = -0{,}214SIZE + 0{,}121SG + 0{,}618ROA + 0{,}011LEV \quad (34)$$

This equation means that one unit increase of Size variable will decrease discretionary expenses level on 0,214. Other variables coefficients are positive, so one unit increase in Sales Growth will rise discretionary expenses REM on 0,121, at the same time, one unit increase in ROA will result in 0,618 increase of REM through discretionary expenses for providing services Russian companies, and one unit rise in Leverage will increase DISEXP_REM on 0,011.

According to the t-tests, Size and Sales Growth are the significant variables for this model, while ROA and Leverage are insignificant.

The relationship between real earnings management and accrual-based earnings management is studied as well for each subset (Table 12 and Table 13) in order to get the full picture on earnings manipulations in studied Russian companies. For both subset the fixed effects model of accrual-based earnings management showed better results according to the number of tests and p-values.

Results of DACC_AEM for production goods subset are presented in the Table 12.

Table 12. Producing Goods Subset REM Regressions' Results

Variables	DACC_AEM	
	Coef.	t-stat
Intercept	-	-
T_REM	-0,065	-5,254 ***
SIZE	0,005	0,545
SG	0,014	2,038 *
ROA	0,692	18,488 ***
LEV	0,002	0,271
Adjusted R^2	0,297	
F-statistic	7,887	
Observations	712	
Signif. codes: 0 '***' 0,001 '**' 0,01 '*' 0,05 '.' 0,1 ' ' 1		

Source: the author

DACC_AEM is a fixed effects model that represents the dependence of level of accrual-based earnings management applied by Russian companies that produce goods from Total REM, Size, Sales Growth, ROA and Leverage. Its Adjusted R^2 equals to 0,297, which means that 29,7% of the variance in the level of AEM used by Russian producing goods companies is explained by the chosen variables. F-statistic is equal to 7,887 with p-value less than 0,01. So, this constructed model can be defined as significant in general model.

According to the regression, the DACC_AEM's equation for production goods subset looks as follow:

$$\text{DACC\_AEM} = -0{,}065\text{T\_REM} + 0{,}005\text{SIZE} + 0{,}014\text{SG} + 0{,}692\text{ROA} + 0{,}002\text{LEV} \quad (35)$$

According to these coefficients, one unit increase in total real earnings management level will lead to the 0,065 decrease in discretionary accruals AEM. DACC also is tested with other variables, so, the increase in one unit of company's Size will increase discretionary accruals in 0,005, while Sales Growth's one unit increase will lead to the DACC rise on 0,014. ROA and Leverage have positive coefficients as well, so the change in one unit will results in 0,692 and 0,002 increase of DACC_AEM respectively.

As for the significance of coefficients, Total REM, Sales Growth and ROA are significant for the constructed model. Company's size and level of leverage are insignificant variables for this model.

Table 13 contains information on results of DACC_AEM for providing services subset.

Table 13. Providing Services Subset REM Regressions' Results

Variables	DACC_AEM	
	Coef.	t-stat
Intercept	-	-
T_REM	-0,409	-15,441 ***
SIZE	0,059	0,872
SG	0,005	0,099
ROA	0,008	0,023
LEV	-0,002	-0,285
Adjusted R^2	0,355	
F-statistic	8,145	
Observations	712	
Signif. codes: 0 '***' 0,001 '**' 0,01 '*' 0,05 '.' 0,1 ' ' 1		

Source: the author

This DACC_AEM model is a fixed effects model, and it shows the relation between the level of accrual-based earnings management used by Russian companies providing services and the list of variables, containing Total REM, Size, Sales Growth, ROA and Leverage. Adjusted R^2 is equal to 0,355, which means that 35,5% of the variance in the level of accrual-based earnings management applied in Russian services companies is explained by the chosen variables. F-statistic is equal to 8,145 with p-value less than 0,01. Therefore, the DACC_AEM for providing services subset model is significant

According to the regression, the DACC_AEM's equation for production goods subset looks as follow:

$$DACC\_AEM = -4{,}409T\_REM + 0{,}059SIZE + 0{,}005SG + 0{,}008ROA - 0{,}002LEV \quad (36)$$

T_REM and Leverage coefficients have negative signs. So, one unit increase in the total level of real earnings management will decrease AEM on 4,409, and one unit rise in leverage will decline accrual-based earnings management on 0,002. Other variables' coefficients are positive. It means that one unit increase in Size will rise AEM level on 0,059, one unit increase in Sales Growth will rise it on 0,005. At the same time, one unit increase in ROA will result in 0,008 decrease of AEM level.

The t-statistics of DACC_AEM for providing services subset variables shows that only total REM level is significant in the model. This is mostly due to the fact that the sample is quite small and consists only of companies that provide some kinds of services without manufacturing physical products.

However, as far as the most important for this study relationship in the model is the one between the discretionary accruals AEM and Total REM, it can be stated that accrual-based earnings management negatively depends on total level of real earnings management of Russian companies in general.

Detailed regressions results for each model are presented in the Appendix 5.

Based on the information presented in this part of the research on the results of the constructed models, only some of the formulated hypotheses can be accepted for both subsets. These hypotheses are H2c and H3a.

Table 14 details reasons of whether each tested hypothesis is accepted or rejected.

Some hypotheses were accepted only for one subset (Producing Goods subset – H2a, Providing Services subset – H1c), and some was rejected only for one subset as well (Producing Goods subset – H3b, Providing Services subset – H1b and H2b). Unfortunately, none of the hypotheses on leverage level influence on REM were neither accepted nor rejected. The situation took place probably due to the specifics of the Russian market and the subsets. As far as the hypotheses were developed based on the previous studies of real earnings management mostly in developed market, such as the US, UK and Israel, the hypotheses failed to be accepted or rejected in the Russian market which is the emerging one. This means that the specific of income manipulations through real earnings management in Russian companies differs from other markets. Other reason for that might be the differences in legislations, or even the mentality and the mindset of managers.

Table 14. Hypotheses' Results

Hypothesis	Regression result	Accepted/Rejected
H1a	No significant relation between SIZE and CFO_REM, sig = 0,567 and sig = 0,260	Neither accepted nor rejected
H1b	Positive relation between SIZE and PROD_REM, sig = 0,016	Rejected for Providing Services subset
H1c	Negative relation between SIZE and DISEXP_REM, sig = 0,006	Accepted for Providing Services subset
H2a	Positive relation between SG and CFO_REM, sig = 0,005	Accepted for Producing Goods subset
H2b	Positive relation between SG and PROD_REM, sig = 0,004	Rejected for Providing Services subset
H2c	Positive relation between SG and DISEXP_REM, sig = 0,012 and sig = 0,046	Accepted for both subsets
H3a	Negative relation between ROA and CFO_REM, sig < 0,001	Accepted for both subsets
H3b	Negative relation between ROA and PROD_REM, sig = 0,004	Rejected for Producing Goods subset
H3c	No significant relation between ROA and DISEXP_REM, sig=0,12 and sig = 0,133	Neither accepted nor rejected
H4a	No significant relation between LEV and CFO_REM, sig=0,845 and sig = 0,9	Neither accepted nor rejected
H4b	No significant relation between LEV and PROD_REM, sig=0,953 and sig = 0,152	Neither accepted nor rejected
H4c	No significant relation between LEV and DISEXP _REM, sig = 0,786 and sig = 0,081	Neither accepted nor rejected

2.2.4 Interpretation of Results

The analysis of real earnings management in Russian companies described in the previous part resulted in several interesting aspects that needs to be explained.

Firstly, real earnings management through sales operations (CFO REM), such as credit sales or abnormal sales discounts, was studied. It is important to note that involvement in REM produces the negative figure of sales operations REM. The evidence of dependance of real earnings management through sales operations on two factors has been presented. These factors

are sales growth and return on assets. As for the Russian companies that produce some sorts of physical goods, this type of firms that face a positive sales growth are less likely to use real earnings management through overproduction than firms with negative sales growth. This result in contradictory to the one provided by Zhang, Hashemi and Rabiee (2011), who stated that the higher the sales growth, the more likely for company to be involved in sales operations manipulations. For both types of Russian companies with lower performance it is not that common to use sales operations real earnings management comparing to the companies with high performance. This result is consistent with research of Cohen, Pandit, Wasley and Zach (2019), as far as they provide evidence on positive dependence of real earnings management on low performance.

Secondly, real earnings management through overproduction was analyzed. The involvement in real earnings management implies positive abnormal production figures. The hypothesis on positive relationship between size was accepted for providing services subset. Therefore, larger Russian service companies are more likely to use overproduction as income manipulation than smaller firms. This situation is consistent with results of Roychowdhury (2006), who proved that larger companies are involved in the overproduction more often. It was assumed that Russian companies with positive sales growth are less likely to use real earnings management through overproduction [Hashemi and Rabiee, 2011]. However, this is not the situation for the Russian companies whose main activity is providing any types of services. Their dependence of REM though overproduction on sales growth is positive. So, service companies that use overproduction to alter their income figures are more likely to have high sales growth values. The feature of Russian production companies that they tend to have negative relation between ROA level and level of overproduction REM. This result is inconsistent with previous studies [Pandit, Wasley and Zach, 2019], as far as it turned out that high-performance level Russian companies that produce goods are more likely to be involved in overproduction that the ones with low-performance level.

Finally, dependence of real earnings management through reduction of discretionary expenses on size and sales growth. Same as in sales operations, the involvement in REM produces the negative figure of discretionary expenses REM. The expected result was that larger companies [Comporek 2020] are more often involved in real earnings management through the reduction of discretionary expenses than smaller ones. The results of the study are consistent with this idea, the constructed regressions showed that for Russian companies that provide services the bigger the company is, the more likely it is to be involved in reducing discretionary expenses in order to manipulate earnings. The idea that Russian companies with positive sales growth are more likely

to use real earnings management through discretionary expenses reduction was proven in both subsets. This fact is consistent with the theory developed by Charfeddine et al. (2013).

No support for influence of level of leverage on any instrument of real earnings management has been found. However, it was proven that it is not very common for Russian companies to combine different techniques of earnings management. Russian companies' managers tend to choose only one technique over other, either accrual-based earnings management or real earnings management.

2.2.5 Managerial Implications of Results

The topic of this Master Thesis is formulated in order to cover a huge research gap on real earnings management presented in the first part of the Report. In general, real earnings management is not as popular among researchers as accrual-based earnings management, and only a small number of studies conducted to real method. Especially the relevance of the topic is due to the lack of studies related to instruments of real earnings management used by Russian companies.

Identifying real earnings management is crucial for making a whole image on company's health and forecasting future performance. Auditors state that they face difficulties to identify real earnings management in companies. Commerford, Hermanson, Houston and Peters (2016) proved that this may have a negative influence on auditors' comfort in their study on attitude of auditors towards real earnings management by conducting interviews among 20 experienced auditors.

As for the responsibility of auditors on real earnings management, the results were mixed, only 4% of responders believes that they are responsible to determine it. Thus, not all auditors actively search real earnings management. Also, auditors answered that real earnings management is hard to be detected due to its ambiguity. Due to this fact, auditors have specific strategy if real earnings management is present. At the beginning, they check to determine whether GAAP had been properly applied and assess the risk. After that they pursue a better understanding of the issue or check disclosure. Also, they stated that real earnings management has a great influence on the audit process overall, which makes auditors feel uncomfortable while working with real earnings management [Commerford, Hermanson, Houston and Peters, 2016].

In other article Commerford (2019) studies the auditors' reaction on real earnings management. He states that when explicit real earnings management is present, auditors will perceive weaker management tone and be more likely to discuss their observations with the audit

committee, and be less likely to retain the client, than when real earnings management is absent. Also, auditor responses to potential real earnings management will be relatively similar to auditor responses to explicit real earnings management when the client narrowly beats an earnings target and relatively similar to the absence of real earnings management when the client misses an earnings target. Hence, the auditor perceptions of management tone will mediate the impact of real earnings management on auditor–client relationship decisions within company [Commerford, 2019]. These facts lead to the conclusion that auditors' independence of opinions and actions are negatively influenced a lot by the usage of real earnings management by companies they have to work with.

So, the results of the Master Thesis may be helpful for external auditors. If unknown instruments of real earnings management are disclosed as a result of the research, auditors will have more information on how managers may manipulate earnings of the company by providing real operations. In this case auditors will feel more concerned and comfortable while working on the determining of income and other manipulations through real operations in different companies, and, therefore, will provide more independent and clear estimation of the company's performance and value.

Another way this research may give benefit is a possibility of increase in protection of the company's investors. Enomoto, Kimura and Yamaguchi (2013) studied the difference in investors' protection from both accrual-based and real earnings management in 38 countries all over the world. They state that real earnings management is more often implemented by managers of companies that operate in countries with stronger investor protection. Due to the fact that investors' protection restricts accrual-based earnings management, it induces a shift to real earnings management, and strong investor protection heightens the risk of firm value reduction by real earnings management and the existence of analysts is effective in monitoring real earnings management.

Therefore, the Master Thesis results will benefit external investors of the companies. Since auditors will be better aware of how the company can manipulate profits through real transactions and will be able to detect real earnings management in the company more easily, they will be able to warn external investors about the manipulation, thereby protecting the investor

Finally, another contribution of this paper is that auditors and investors that operates on the territory of the Russian Federation may become aware of the fact that Russian company may be involved in manipulating activities through real earnings management.

Conclusions

Main goal of the research was to identify main instruments of real earnings management that are used by Russian companies and investigate the dependence of using each instrument on different factors, such as size of the company, its sales growth, returns on assets and level of leverage. The evidence has been found that Russian companies may be using all three REM instruments that were studied within the framework of the research, such as sales manipulation REM, overproduction REM and reduction of discretionary expenses REM.

The relations between each REM instrument and different factors, such as size of the company, its sales growth, its return on assets, and leverage level were studied for Russian-owned companies. Sales manipulation REM level has positive significant relationships with sales growth, and negative relationships with ROA. As for the production REM, it has positive significant relations with size and sales growth, and negative significant dependance on ROA, while discretionary expenses REM have negative significant relation with size and positively significantly depends on the sales growth.

Therefore, Russian companies that produce some sorts of physical goods and face a positive sales growth are less likely to use real earnings management through overproduction than firms with negative sales growth, as well as Russian companies with lower performance that are less likely to use sales operations real earnings management comparing to the companies with high performance. Larger Russian companies that involved in service activities are more likely to use overproduction as income manipulation than smaller firms, Russian service companies that use overproduction to alter their income figures are more likely to have high sales growth values, while high-performing Russian companies that produce goods are more likely to be involved in overproduction that the ones with low-performance level. As for the discretionary expenses real earnings management, larger Russian companies that provide some sorts of services are more likely to be involved in reducing discretionary expenses as a way of real management, also, Russian companies with positive sales growth are more likely to use real earnings management through discretionary expenses reduction. However, no relation between real earnings management instruments and leverage level has been proven for Russian companies that were studied.

The research also concludes that the relationship between AEM and REM practices of Russian companies are negative. It means that Russian companies are more likely to choose one

type of earnings manipulations rather over another, rather than combine accrual-based and real techniques of earnings management at the same time.

Study has several managerial implementations. Firstly, it provides auditors with the information on what instruments managers of Russian companies may use in order to improve the financial reports. Secondly, it protects potential and existing investors of Russian companies from information asymmetry.

Moreover, the study covers the research gap on real earnings management literature by providing unique results on dependance of real earnings management techniques used by Russian companies on number of factors, such as size of the company, sales growth, returns on assets and level of leverage.

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Appendix 1. List of Companies

CJSC DIXY
CJSC Mikoyan
IPJSC RUSAL
JSC Atomenergoprom
JSC AVANGARD-AGRO
JSC BSC
JSC ER-Telecom Holding
JSC ETALON LENSPECSMU
JSC FCT
JSC FPC
JSC HYDROMASHSERVICE
JSC Krasnokamsk Metal Mesh Works
JSC Levenhuk
JSC Media Group VIM
JSC Mosenergo
JSC MRSK Ural
JSC MurmanTEC
JSC OSHZ
JSC OSMP
JSC OTCPharm
JSC PA UOMP
JSC PermEnergoSbyt
JSC Polyplast
JSC PRISCO
JSC PROTEK
JSC Rosinter Restaurants
JSC ROSNEFT
JSC Russian Helicopters
JSC RZD
JSC TMH
JSC United engine corporation
JSC YATEC
LLC Agronova-L
LLC Legenda
LLC NPGE
LLC O'KEY Group
OJSC Krasny Oktyabr
OPJSC Central Telegraph
OPJSC KOMKOR
PJSC "RussNeft"
PJSC Abrau-Durso
PJSC Acron
PJSC Aeroflot
PJSC ALROSA
PJSC AO Energy Systems of the East
PJSC Bashneft
PJSC BELUGA GROUP
PJSC BKE
PJSC Cherkizovo Group
PJSC CHZPSN
PJSC CZP
PJSC DIOD
PJSC Dorogobuzh
PJSC DVEC
PJSC FESCO
PJSC FGC UES
PJSC Fizika
PJSC Freight One
PJSC Gazprom Neft
PJSC Human Stem Cells Institute
PJSC IDGC of the North-West
PJSC INTER RAO
PJSC Irkutskenergo
PJSC KGK
PJSC Khimprom
PJSC Koks
PJSC KSK Kaluga
PJSC KTK
PJSC KuibyshevAzot
PJSC KUZOCM
PJSC Lenzoloto
PJSC LSR Group
PJSC Lukoil
PJSC M.video
PJSC Magnit
PJSC MegaFon
PJSC MMK
PJSC MOEK
PJSC MORION
PJSC Moscow City Telephone Network
PJSC Mostotrest
PJSC MRSK-1
PJSC MRSK-CP
PJSC MTS

PJSC Nauka
PJSC Nizhnekamskshina
PJSC NLMK
PJSC Novoship
PJSC OGK-2
PJSC OR Group
PJSC Pavlovo Bus Factory
PJSC Polyus
PJSC Quadra – Power Generation
PJSC Raspadskaya
PJSC Rosseti
PJSC Rosseti Lenenergo
PJSC Rosseti Moscow Region
PJSC Rosseti Siberia
PJSC Rosseti Volga
PJSC RSC Energia
PJSC RusHydro
PJSC Ruspolymet
PJSC Seligdar
PJSC Severstal
PJSC SIBUR
PJSC SLAVNEFT
PJSC Slavneft-YANOS
PJSC SN-MNG
PJSC Southern Kuzbass Coal Company
PJSC Sovcomflot
PJSC Surgutneftegas
PJSC TATNEFT
PJSC Tattelecom
PJSC TGK-1
PJSC TGK-14
PJSC TGK-2
PJSC TMK
PJSC TNS Energo
PJSC TNS Energo
PJSC TNS-ELECTRO Kuban
PJSC TNS-ELECTRO Mari-El
PJSC TNS-ELECTRO Rostov
PJSC TNS-ELECTRO Yaroslavl
PJSC Transneft
PJSC TRK
PJSC UAC
PJSC Unipro
PJSC VHZ
PJSC VimpelCom
PJSC VSMPO-AVISMA
PJSC Vyborg Shipyard
PJSC World Trade Center
PJSC Yakutskenergo

Appendix 2. Sample Descriptive Statistics

Descriptive Statistics of Sample

	Total assets	Sales	Cash flows from operations	Production costs	Discretionary expenses
Mean	10,7306	10,6035	9,6180	15,7095	8,9315
Minimum	8,7185	8,1933	6,0660	11,9447	10,3735
Maximum	12,7986	12,9091	12,0614	12,2650	11,3919
Standard Error	0,0273	0,0265	0,0336	0,1428	0,1371
Median	10,8046	10,6512	9,7635	9,5540	0,0000
Mode	#N/A	#N/A	#N/A	#N/A	#N/A
Standard Deviation	0,8890	0,8645	1,0957	4,6575	4,4724
Sample Viarance	0,7903	0,7474	1,2006	21,6923	20,0024
Kurtosis	-0,5595	-0,0120	-0,1407	-1,2271	-1,8304
Skewness	-0,0693	-0,3152	-0,4129	-0,8033	0,2247
Range	4,0801	4,7157	5,9954	12,2650	11,3919
Observations	1064	1064	1064	1064	1064

Descriptive Statistics of Production Goods Subset

	Total assets	Sales	Cash flows from operations	Production costs	Discretionary expenses
Mean	10,8143	10,6326	9,6981	7,2401	4,3710
Minimum	8,7185	8,2536	6,4278	7,5185	5,2856
Maximum	12,7986	12,9091	12,0614	12,2650	11,3919
Standard Error	0,0326	0,0326	0,0406	0,1724	0,1682
Median	10,9197	10,6986	9,8756	9,6075	9,6896
Mode	#N/A	#N/A	#N/A	#N/A	#N/A
Standard Deviation	0,8694	0,8705	1,0821	4,6007	4,4877
Sample Viarance	0,7559	0,7579	1,1708	21,1665	20,1396
Kurtosis	-0,4066	0,0151	-0,1196	-1,0957	-1,8585
Skewness	-0,1772	-0,3204	-0,4830	-0,8744	0,1233
Range	4,0801	4,6555	5,6336	12,2650	11,3919
Observations	712	712	712	712	712

Descriptive Statistics of Providing Services Subset

	Total assets	Sales	Cash flows from operations	Production costs	Discretionary expenses
Mean	10,5612	10,5446	9,4561	6,7722	3,6579
Minimum	8,8627	8,1933	6,0660	5,1875	4,5051
Maximum	12,7130	12,3992	11,6751	12,1910	11,1450
Standard Error	0,0482	0,0453	0,0590	0,2538	0,2350
Median	10,7086	10,6068	9,5082	9,5218	10,3804
Mode	#N/A	#N/A	#N/A	#N/A	#N/A
Standard Deviation	0,9051	0,8503	1,1069	4,7616	4,4091
Sample Viarance	0,8192	0,7231	1,2251	22,6724	19,4401
Kurtosis	-0,6444	-0,0522	-0,0778	-1,4503	-1,7101
Skewness	0,1674	-0,3185	-0,2797	-0,6700	0,4375
Range	3,8502	4,2059	5,6091	12,1910	11,1450
Observations	352	352	352	352	352

Appendix 3. Descriptive Statistics of Variables

Descriptive Statistics of Sample Variables

	Sales growth	Size	ROA	Leverage
Mean	0,2068	24,7081	0,0394	1,4359
Minimum	-0,3694	20,0752	0,0005	0,0005
Maximum	1,3957	29,4699	0,3145	39,8740
Standard Error	0,0107	0,0628	0,0022	0,1020
Median	0,0816	24,8784	0,0271	0,4917
Mode	#N/A	#N/A	#N/A	#N/A
Standard Deviation	0,3502	2,0470	0,0720	3,3261
Sample Viarance	0,1226	4,1901	0,0052	11,0627
Kurtosis	0,9474	-0,5595	2,2454	48,9611
Skewness	1,4323	-0,0693	0,4176	6,0531
Range	1,7652	9,3948	0,3140	39,8735
Observations	1064	1064	1064	1064

Descriptive Statistics of Production Goods Subset Variables

	Sales growth	Size	ROA	Leverage
Mean	0,2118	24,9009	0,0451	1,1678
Minimum	-0,3694	20,0752	0,0002	0,0005
Maximum	1,3957	29,4699	0,3145	38,3245
Standard Error	0,0132	0,0750	0,0028	0,1037
Median	0,0893	25,1435	0,0326	0,4572
Mode	#N/A	#N/A	#N/A	#N/A
Standard Deviation	0,3534	2,0020	0,0758	2,7670
Sample Viarance	0,1249	4,0079	0,0057	7,6565
Kurtosis	0,8224	-0,4066	1,9989	78,4397
Skewness	1,3663	-0,1772	0,4929	7,6145
Range	1,7652	9,3948	0,3143	38,3240
Observations	712	712	712	712

Descriptive Statistics of Providing Services Subset Variables

	Sales growth	Size	ROA	Leverage
Mean	0,1966	24,3180	0,0277	1,9781
Minimum	-0,3117	20,4072	0,0008	0,0006
Maximum	1,2286	29,2727	0,2433	39,8740
Standard Error	0,0183	0,1111	0,0033	0,2233
Median	0,0715	24,6575	0,0196	0,5358
Mode	#N/A	#N/A	#N/A	#N/A
Standard Deviation	0,3439	2,0841	0,0624	4,1897
Sample Viarance	0,1183	4,3433	0,0039	17,5532
Kurtosis	1,2693	-0,6444	2,2228	27,2015
Skewness	1,5807	0,1674	-0,1012	4,5292
Range	1,5403	8,8655	0,2425	39,8734
Observations	352	352	352	352

Appendix 4. Models Choosing

Producing Goods Subset Model Choosing

	T_REM		CFO_REM		PROD_REM	
Model	P-value	Adj. R-Squared	P-value	Adj. R-Squared	P-value	Adj. R-Squared
Pooling OLS	< 0,01	0,4246	< 0,01	0,7091	< 0,01	0,3149
Fixed effects	0,84	-0,1459	< 0,01	0,6385	0,03	0,2921
Random effects	0,89	-0,004	< 0,01	0,1391	0,01	0,09211

	DISEXP_REM		DACC_AEM	
Model	P-value	Adj. R-Squared	P-value	Adj. R-Squared
Pooling OLS	0,001	0,3693	< 0,01	0,4785
Fixed effects	0,15	-0,1361	< 0,01	0,2907
Random effects	0,35	0,0006	< 0,01	0,3367

Producing Goods Subset Tests Results

	T_REM	CFO_REM	PROD_REM	DISEXP_REM	DACC_AEM
Test	P-value	P-value	P-value	P-value	P-value
Breusch-Pagan Test	< 0,01	0,22	< 0,01	0,33	0,68
F test	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01
Hausman Test	0,89	0,05	0,28	0,34	< 0,01

Providing Services Subset Model Choosing

	T_REM		CFO_REM		PROD_REM	
Model	P-value	Adj. R-Squared	P-value	Adj. R-Squared	P-value	Adj. R-Squared
Pooling OLS	< 0,01	0,4716	< 0,01	0,3256	< 0,01	0,2493
Fixed effects	0,12	-0,1272	0,19	-0,1315	0,04	-0,1182
Random effects	0,12	0,0931	< 0,01	0,0326	< 0,01	0,2639

	DISEXP_REM		DACC_AEM	
Model	P-value	Adj. R-Squared	P-value	Adj. R-Squared
Pooling OLS	< 0,01	0,81043	0,02	0,8416
Fixed effects	< 0,01	0,8205	< 0,01	0,3545
Random effects	0,02	0,0206	0,08	0,01378

Providing Services Subset Tests Results

	T_REM	CFO_REM	PROD_REM	DISEXP_REM	DACC_AEM
Test	P-value	P-value	P-value	P-value	P-value
Breusch-Pagan Test	< 0,01	0,12	< 0,01	<0,01	0,04
F test	< 0,01	0,61	< 0,01	< 0,01	< 0,01
Hausman Test	0,36	0,64	0,15	< 0,01	< 0,01

Appendix 5. Models Summaries

Producing Goods Subset Summary Tables

T_REM Summary Table

	T_REM		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	-0,98	-1,46 – -0,49	**<0,001**
size	0,04	0,02 – 0,06	**<0,001**
sg	0,02	-0,08 – 0,13	0,659
roa	0,89	0,37 – 1,40	**0,001**
lev	0,00	-0,01 – 0,02	0,549
Observations	712		
R^2 adjusted	0,425		

CFO_REM Summary Table

	CFO_REM		
Predictors	*Estimates*	*CI*	*p*
size	0.00	-0.01 – 0.02	0.567
sg	0.02	0.01 – 0.03	**0.005**
roa	-0.35	-0.42 – -0.28	**<0.001**
lev	0.00	-0.00 – 0.00	0.845
Observations	712		
R^2 adjusted	0,639		

PROD_REM Summary Table

	PROD_REM		
Predictors	*Estimates*	*CI*	*p*
size	-0,03	-0,09 – 0,02	0,199
sg	0,00	-0,04 – 0,05	0,823
roa	-0,34	-0,58 – -0,11	**0,004**
lev	0,00	-0,01 – 0,01	0,953
Observations	712		
R^2 adjusted	0,2921		

DISEXP_REM Summary Table

	DISEXP_REM		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	0,049	-0,02 – 0,11	0,151
size	0,001	-0,00 – 0,00	0,528
sg	0,003	-0,01 – 0,02	**0,012**
roa	-0,056	-0,13 – 0,01	0,120
lev	0,001	-0,00 – 0,00	0,204
Observations	712		
R^2 adjusted	0,364		

DACC_AEM Summary Table

	DACC_AEM		
Predictors	*Estimates*	*CI*	*p*
tot_rem	-0,07	-0,09 – -0,04	**<0,001**
size	0,00	-0,01 – 0,02	0,586
sg	0,01	0,00 – 0,03	**0,042**
roa	0,69	0,62 – 0,77	**<0,001**
lev	0,00	-0,00 – 0,00	0,786
Observations	712		
R^2 adjusted	0,297		

Providing Services Subset Summary Tables

T_REM Summary Table

		T_REM	
Predictors	*Estimates*	*CI*	*p*
(Intercept)	-3,30	-4,88 – -1,71	**<0,001**
size	0,13	0,07 – 0,20	**<0,001**
sg	-0,01	-0,40 – 0,37	0,946
roa	-2,51	-4,63 – -0,39	**0,021**
lev	0,00	-0,03 – 0,03	0,963
Observations	352		
R^2 adjusted	0,425		

CFO_REM Summary Table

		CFO_REM	
Predictors	*Estimates*	*CI*	*p*
(Intercept)	-0,31	-0,84 – 0,23	0,260
size	0,01	-0,01 – 0,04	0,207
sg	0,05	-0,08 – 0,17	0,493
roa	-1,39	-2,10 – -0,67	**<0,001**
lev	0,00	-0,01 – 0,01	0,900
Observations	352		
R^2 adjusted	0,326		

PROD_REM Summary Table

	PROD_REM		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	-3,21	-5,69 – -0,72	**0,012**
size	0,12	0,02 – 0,22	**0,016**
sg	0,14	0,04 – 0,23	**0,004**
roa	-0,31	-0,95 – 0,34	0,350
lev	0,01	-0,00 – 0,02	0.152
Observations	352		
R^2 adjusted	0,249		

DISEXP_REM Summary Table

	DISEXP_REM		
Predictors	*Estimates*	*CI*	*p*
size	-0,21	-0,36 – -0,06	**0,006**
sg	0,12	0,00 – 0,24	**0,046**
roa	0,62	-0,19 – 1,42	0,133
lev	0,01	-0,00 – 0,02	0,081
Observations	352		
R^2 adjusted	0,821		

DACC_AEM Summary Table

	DACC_AEM		
Predictors	*Estimates*	*CI*	*p*
tot_rem	-0,41	-0,46 – -0,36	**<0,001**
size	0,06	-0,07 – 0,19	0,384
sg	0,01	-0,10 – 0,11	0,922
roa	0,01	-0,70 – 0,71	0,981
lev	-0,00	-0,01 – 0,01	0,776
Observations	352		
R^2 adjusted	0,355		